



- Thanks for Allah for giving me the courage and patience to achieve this work.
- To my daughter who I wish to read this work very soon and who I try to gain here love.
- To my students whom I love very much.
- To my patients, the first teacher for me and the centre of medical universe.

Prof. Gamal Moussa, MD

VISIT...

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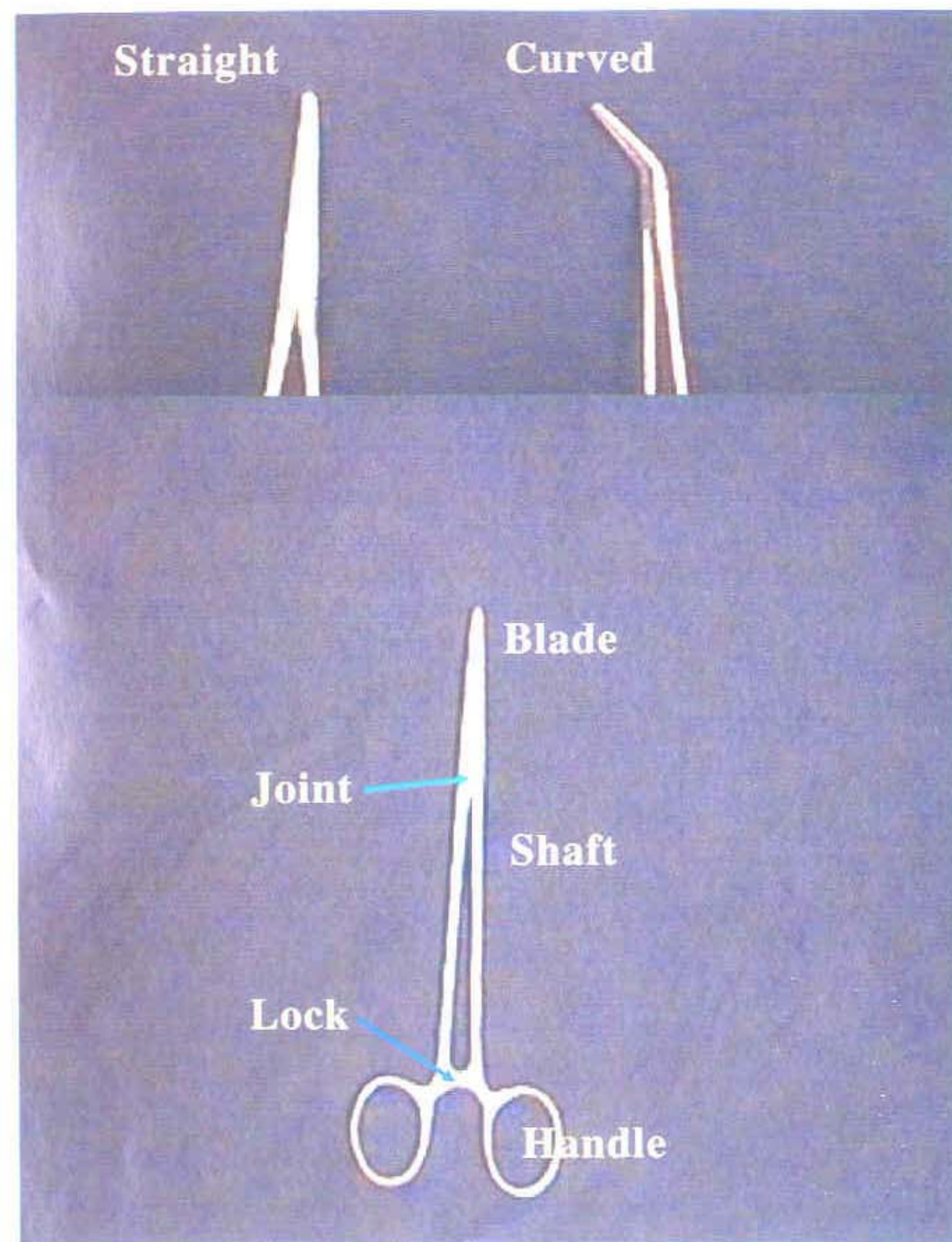
I- Articulating instruments.
Means instruments with joint

A-Instruments with joint and lock

1- Mosquito forceps :

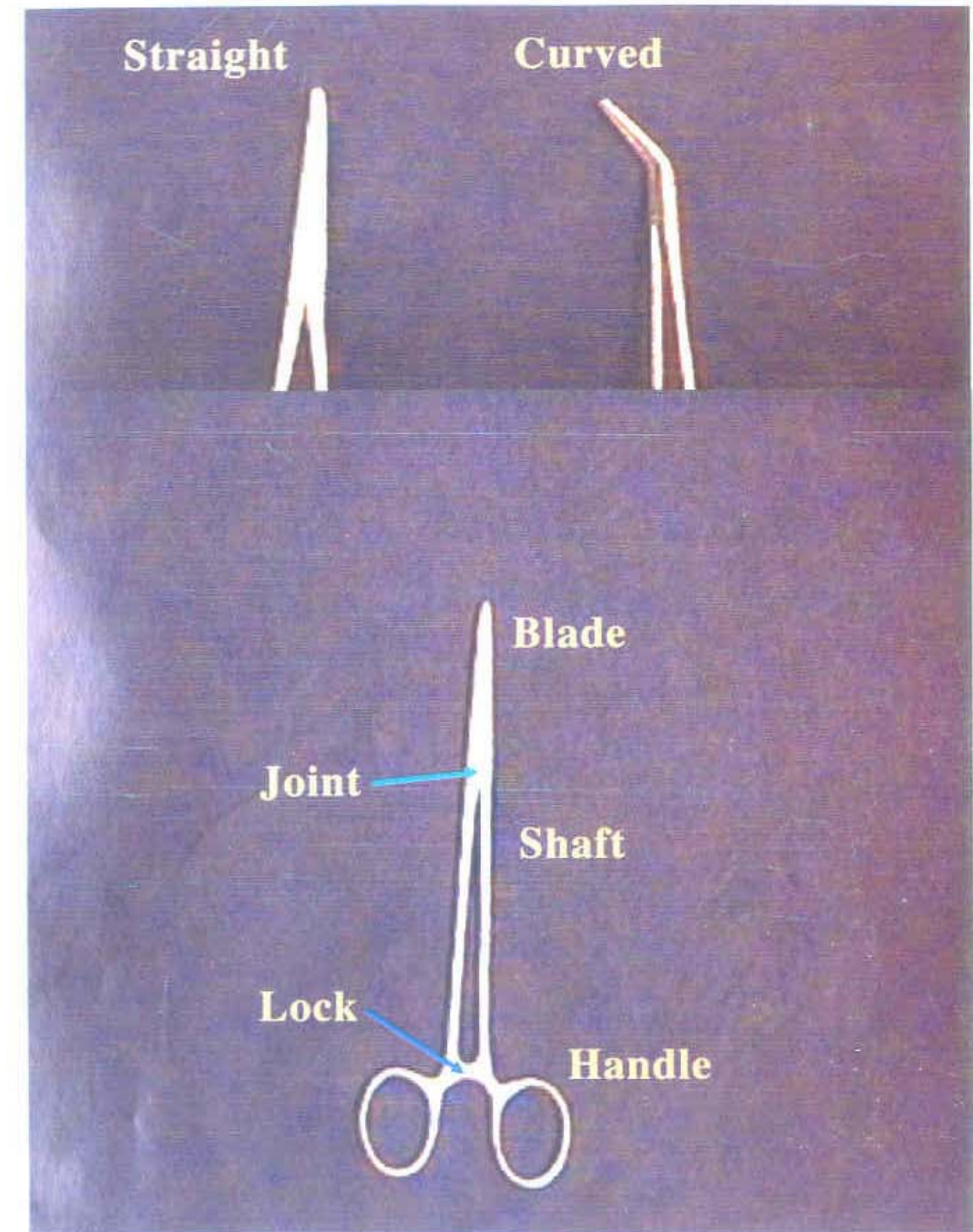
Used for haemostasis as in:

- 1- Catching small subcutaneous vessels during skin incision.
 - 2- Sub mucosal vessels in resection anastomosis of the intestine.
 - 3- Traction on the skin of the prepuce before bone cutting forceps application in circumcision.
 - 4- Neonates and pediatric surgery.
- The above indications are just examples.



2- Artery forceps :

- Larger than mosquito forceps.
- Used for haemostasis as in :
 - 1- Catching of medium sized vessels as subcutaneous vessels during skin incision or epiploic vessels during splenectomy before their ligation .
 - 2- Elevation of the partial peritoneum before its opening in all abdominal operations.
 - 3- Placed on the fundus & Hartman,s pouch of the gallbladder, the first retracted upwards and laterally and the second downward and laterally to open the Calot,s triangle .
 - 4- Ligation of perforators entering the breast from its bed during mastectomy .
 - 5- Ligation of spermatic veins during varicocelelectomy.
 - 6- Grasping the pedicles of piles in haemorrhoidectomy.
- The above indications are just examples.



REVIEW OF SURGICAL INSTRUMENTS

What are the differences between Mosquito, Artery and Clamp instruments ?

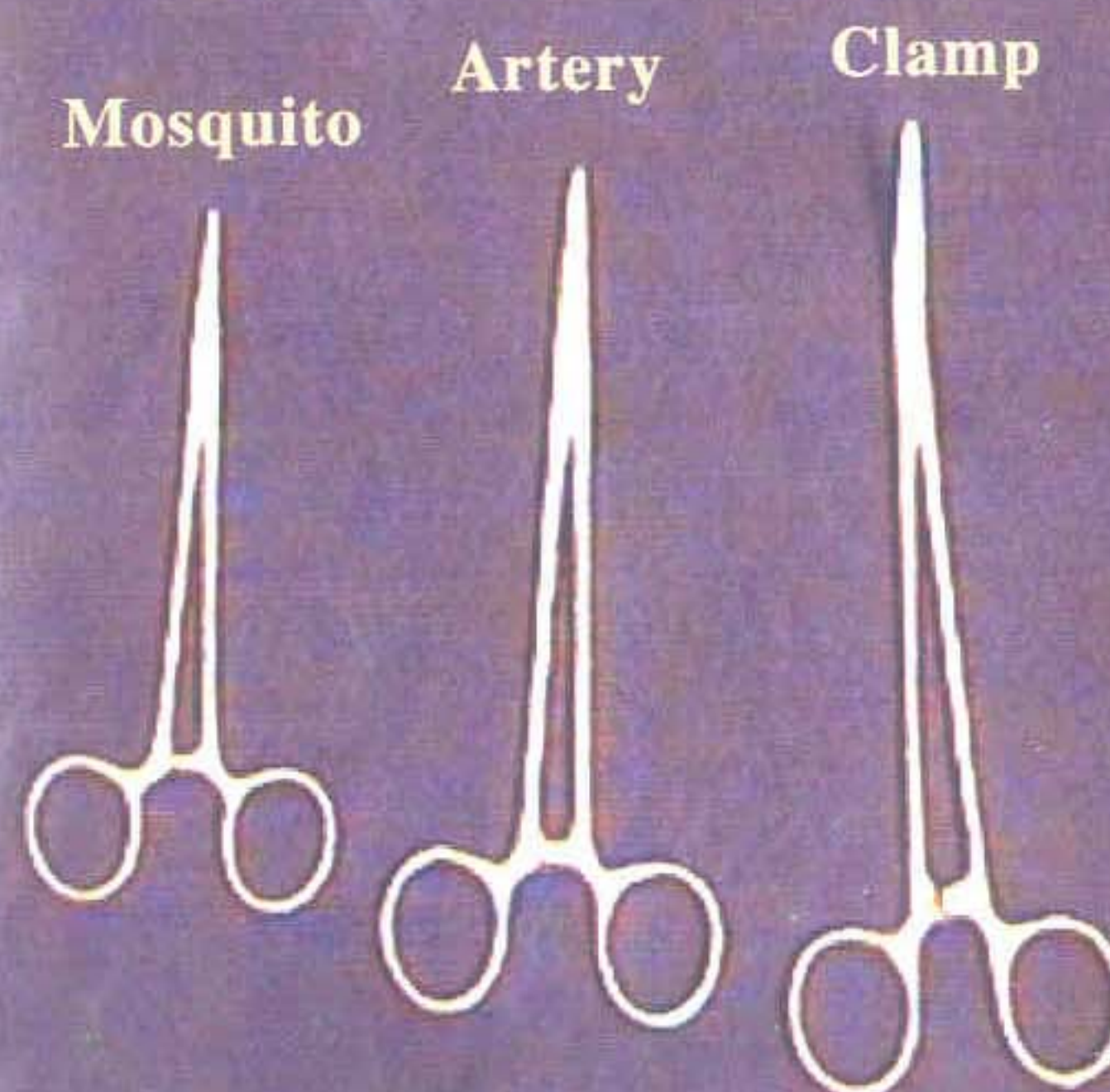
- All these instruments consist of :
 - 1- Handle.
 - 2- Shaft.
 - 3- Blade.
 - 4- Joint between blade and shaft.
 - 5- Lock between handle and shaf.
- There is no difference between Mosquito, Artery and Clamp instruments except for their size only .
- These instruments sometimes called haemostatic instruments.

What is the importance of the lock in surgical instruments?

- It maintains closure of the instruments after tissue grasping.

REVIEW OF SURGICAL INSTRUMENTS

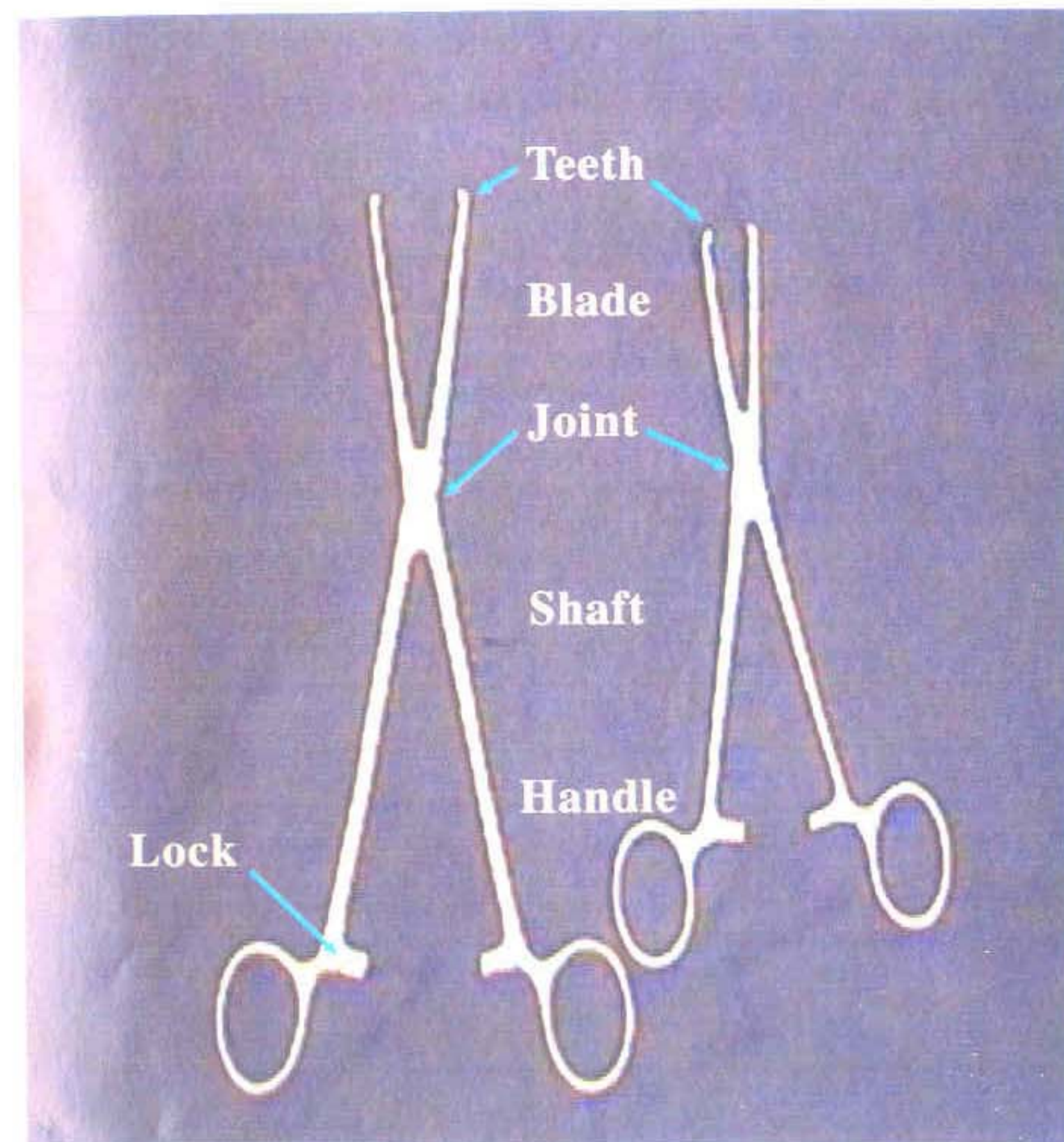
What is the difference between this three instruments?



4- Kocher forceps :

- 1- Used for grasping tough structures (tendon, sheath or muscle).
- The anterior lamina (wall) of the rectus sheath in paramedian incision to facilitate its dissection from rectus abdominus before its displacement laterally.
- Muscle in muscle splitting incisions .
- 2- Crushing the base of the appendix in appendectomy. We do 3 crushes. One at the base to prevent slipping of ligature, the second we cut through push pus from the site of cut and the third keep Kocher to prevent spillage of the pus .
- 3- Part of skin must be removed during operation as old scar.
- 4- Closure of intestinal lumen for the specimen which will be removed during resection anastomosis.
- The above indications are just examples.

REVIEW OF SURGICAL INSTRUMENTS



REVIEW OF SURGICAL INSTRUMENTS

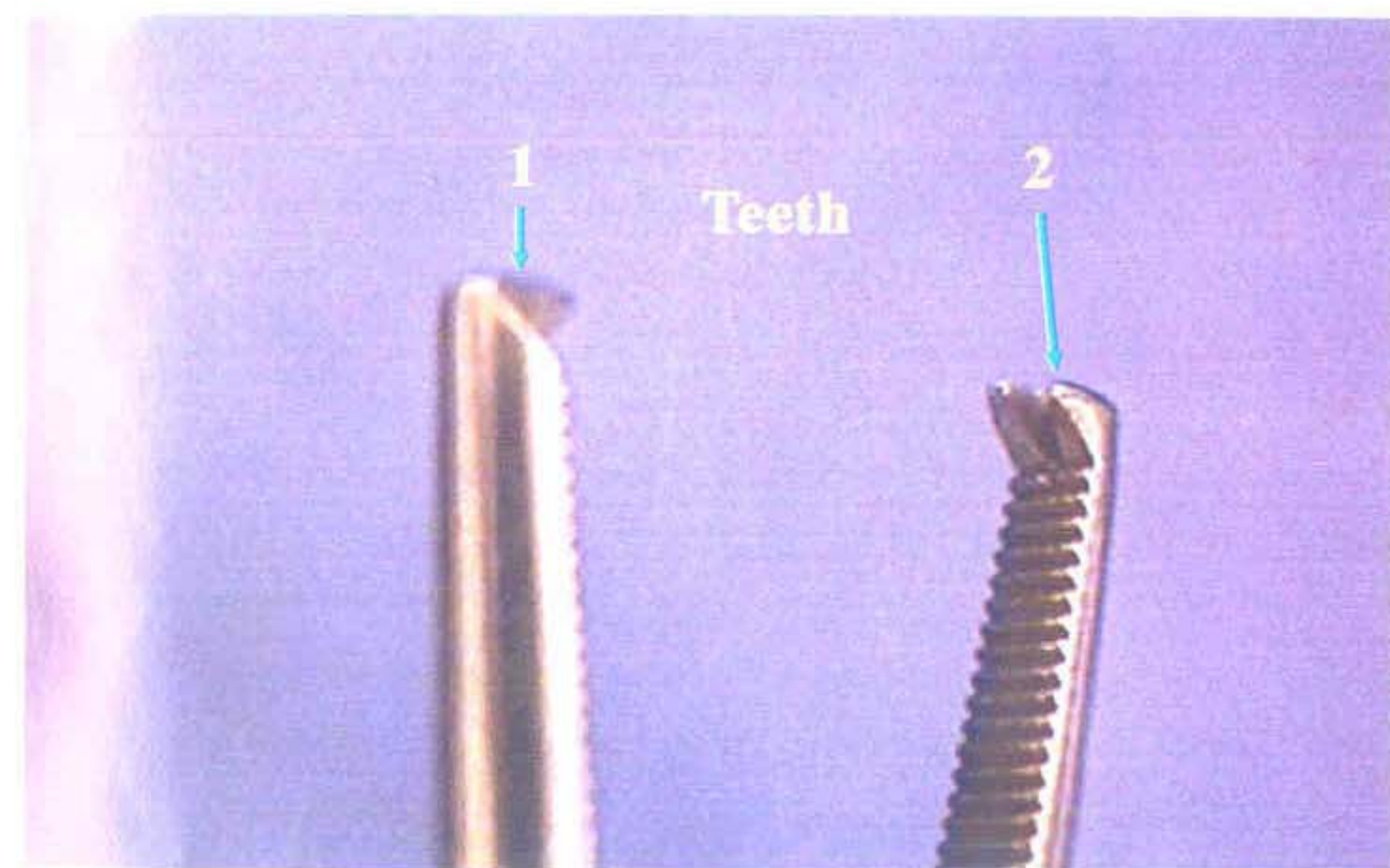
What are the differences between Kocher and artery forceps?

- It consists of:- Handle, shaft, blade, lock and joint similar to the artery but :
- 1- The length of the blade in relation to the shaft :
In the artery forceps the blade measure about $\frac{1}{2}$ the shaft but in Kocher the blade about $\frac{2}{3}$ of the shaft .
- 2- The teeth present (1x2) at the tip of Kocher blades.

N.B.:

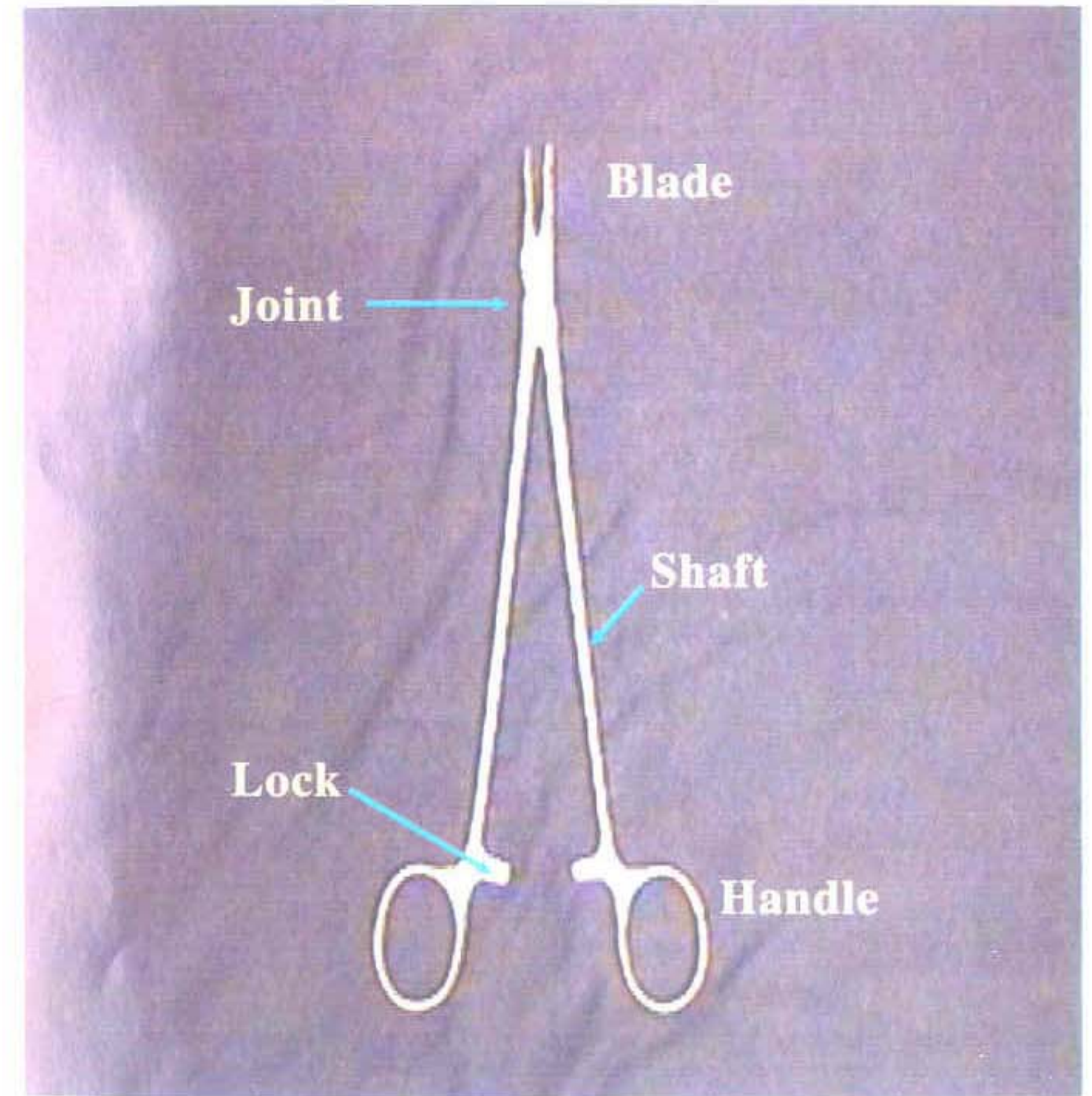
- There are different sizes of Kocher (small , medium and large).
- There are curved and straight kochers .

REVIEW OF SURGICAL INSTRUMENTS



5- Needle holder :

- *Grasp the needle during making a stitch.
- The pattern of corrugation to give a good grip to the needle and prevent its slipping or rotation .
- There are different sizes of needle holder, the large one to enable the surgeon to take stitches in the depth.
- There is some needle holder with slight curve on its shaft.
- But we must always remember that we know the holder from its blade (short) and the pattern of its corrugations .

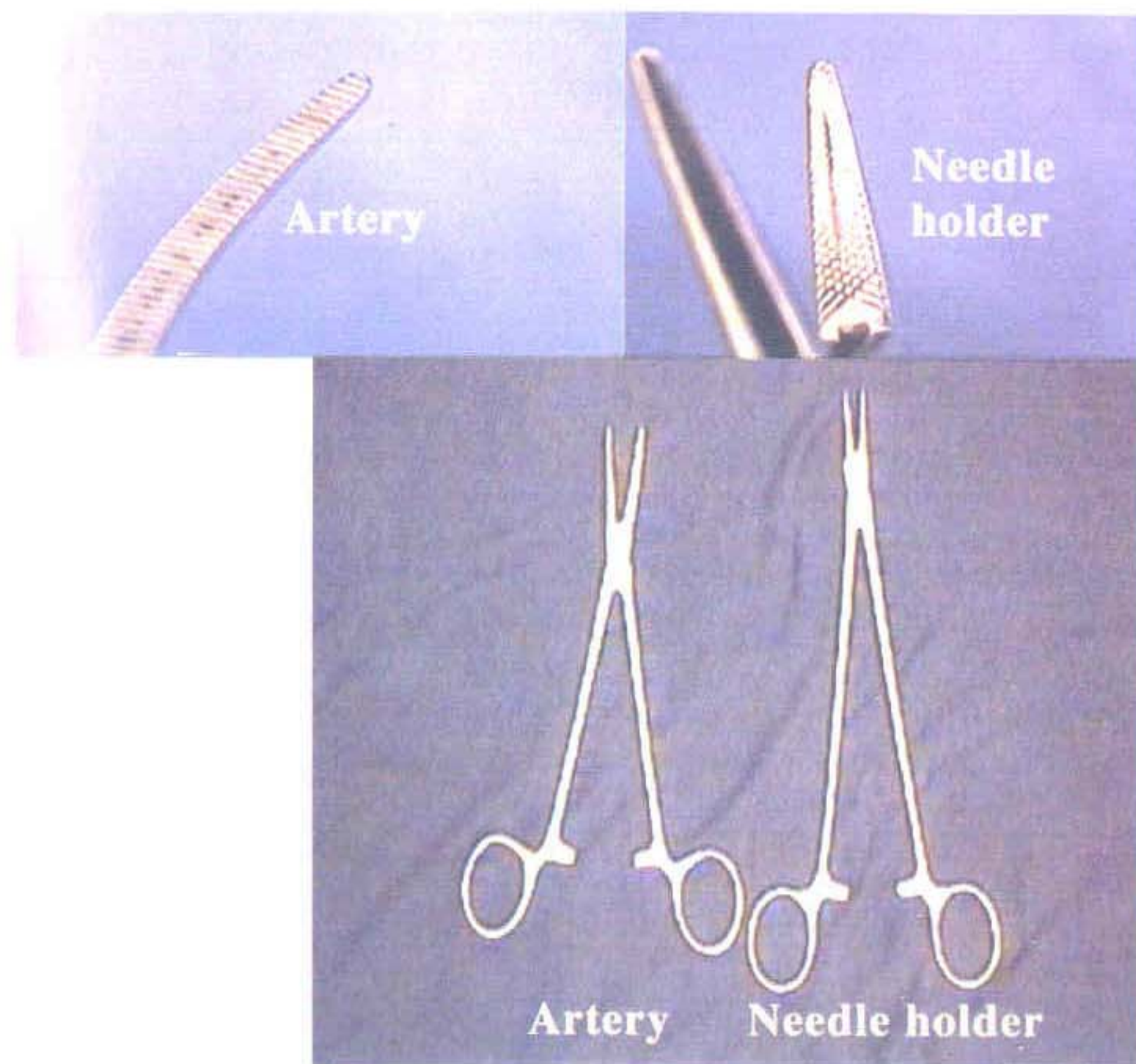


REVIEW OF SURGICAL INSTRUMENTS

What are the differences between the artery forceps and the needle holder ?

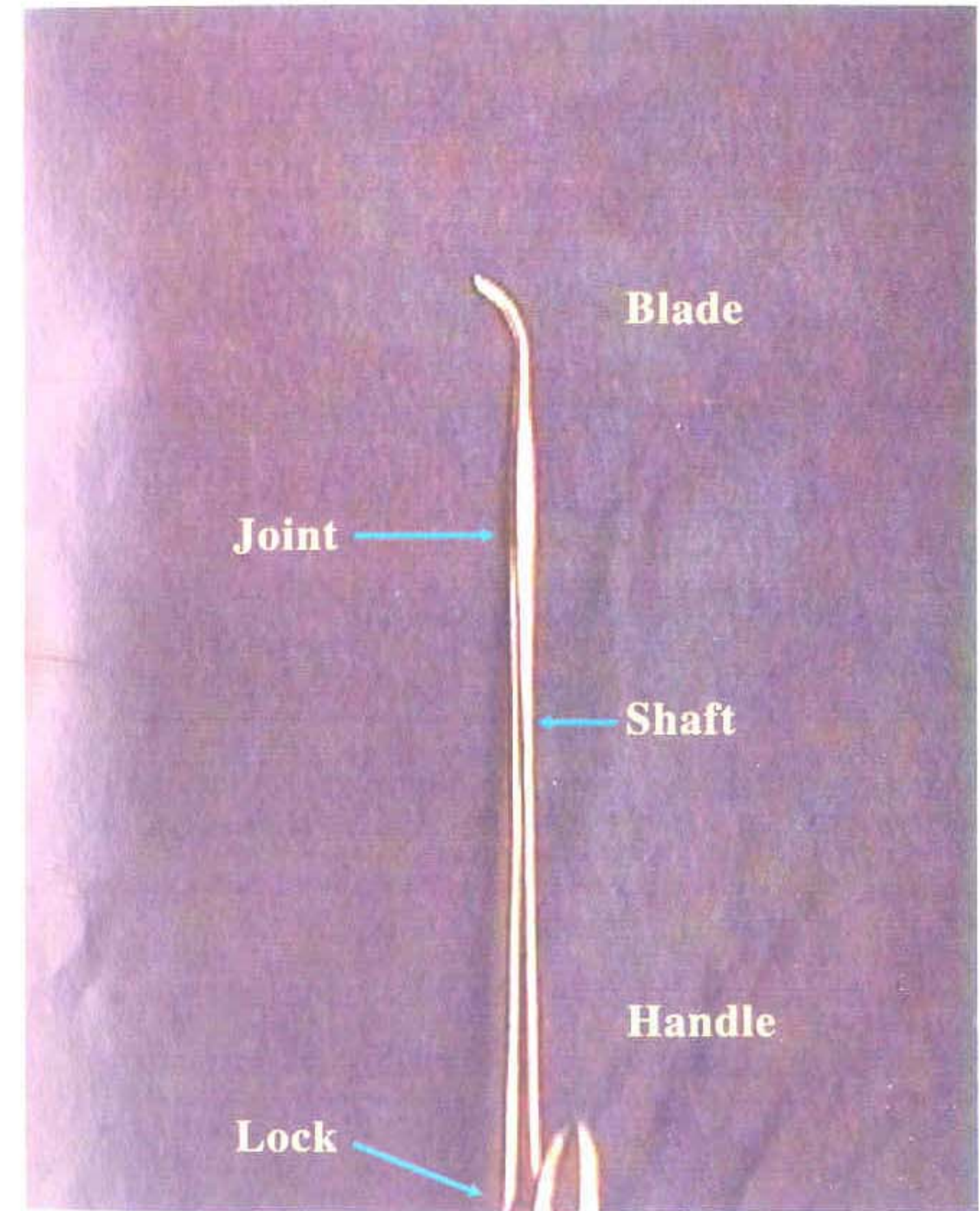
- It consists of:- Handle, shaft, blade, lock and joint similar to the artery but the differences between artery and needle holder are :
 - 1- The length of the blade in relation to shaft (The blade long in artery) .
 - 2- Corrugations present on the blade of the needle holder are shallow, small and in different directions (may be present in the form of squares).
 - 3- Groove sometimes present on the blade of the holder.

REVIEW OF SURGICAL INSTRUMENTS



6- Moynihan Artery (Cholecystectomy forceps) :

- Used for grasping the cystic vessels & cystic duct before their ligation during cholecystectomy operation .
- Also used for encircling any deep vessels with a ligature .



7- Intestinal clamp :

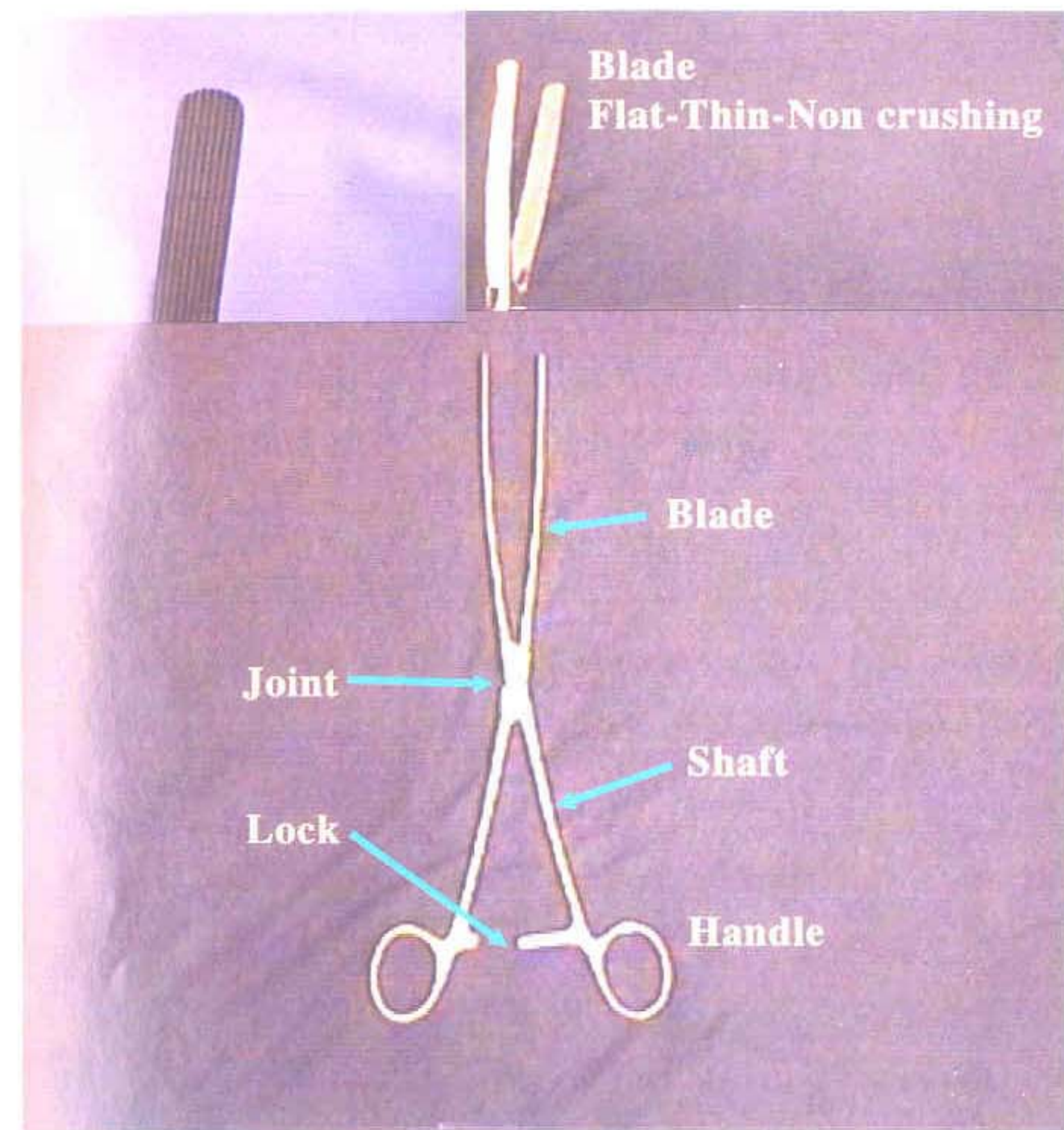
- Used for grasp the intestinal loop to prevent spilling out of its content during resection anastomosis .
- The blades are too long in relation to the shaft to avoid a heavy crushing and devitalization to the intestinal segment .

What are the types of intestinal clamps?

- 1- Non crushing type with flat and thin blade put for the side of the intestine where the anastomosis will take place .
- 2- Crushing type with flat and heavy blade for the side of the intestine will be removed. Sometimes we use Kocher forceps in the place of crushing clamp .

What are the differences between the artery forceps and intestinal clamps ?

- It consists of:-Handle, shaft, blade, lock and joint similar to the artery but :
 - 1- The blade of the clamps is large in relation to shaft to avoid marked squeezing to the tissue .
 - 2- The Corrugations on the clamp blades are vertical.
- There is a gastric clamp for gastrectomy operations but with 4 blades .



7- Intestinal clamp :

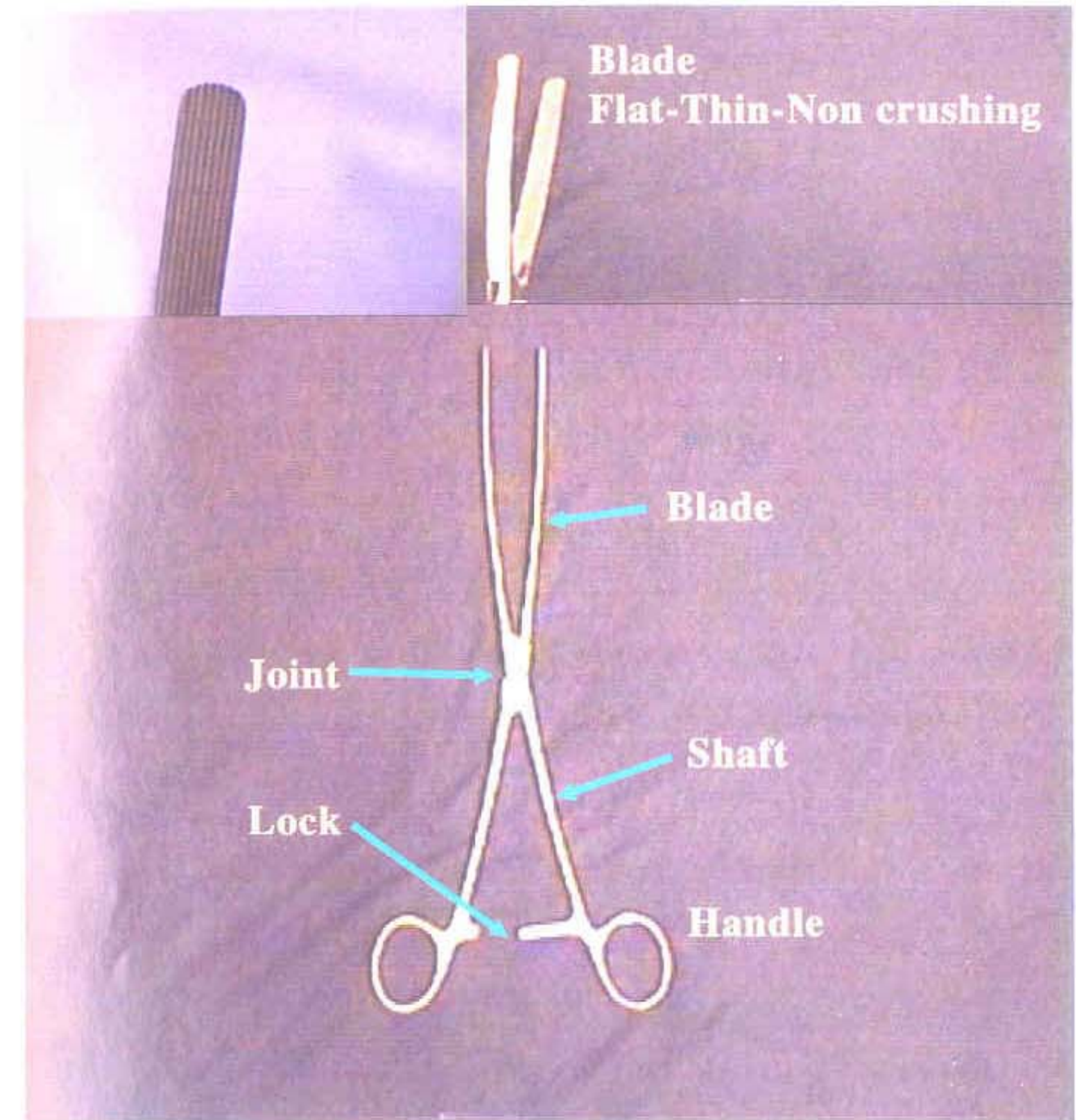
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8- Allis forceps :

A-Used for traction of the skin as in :

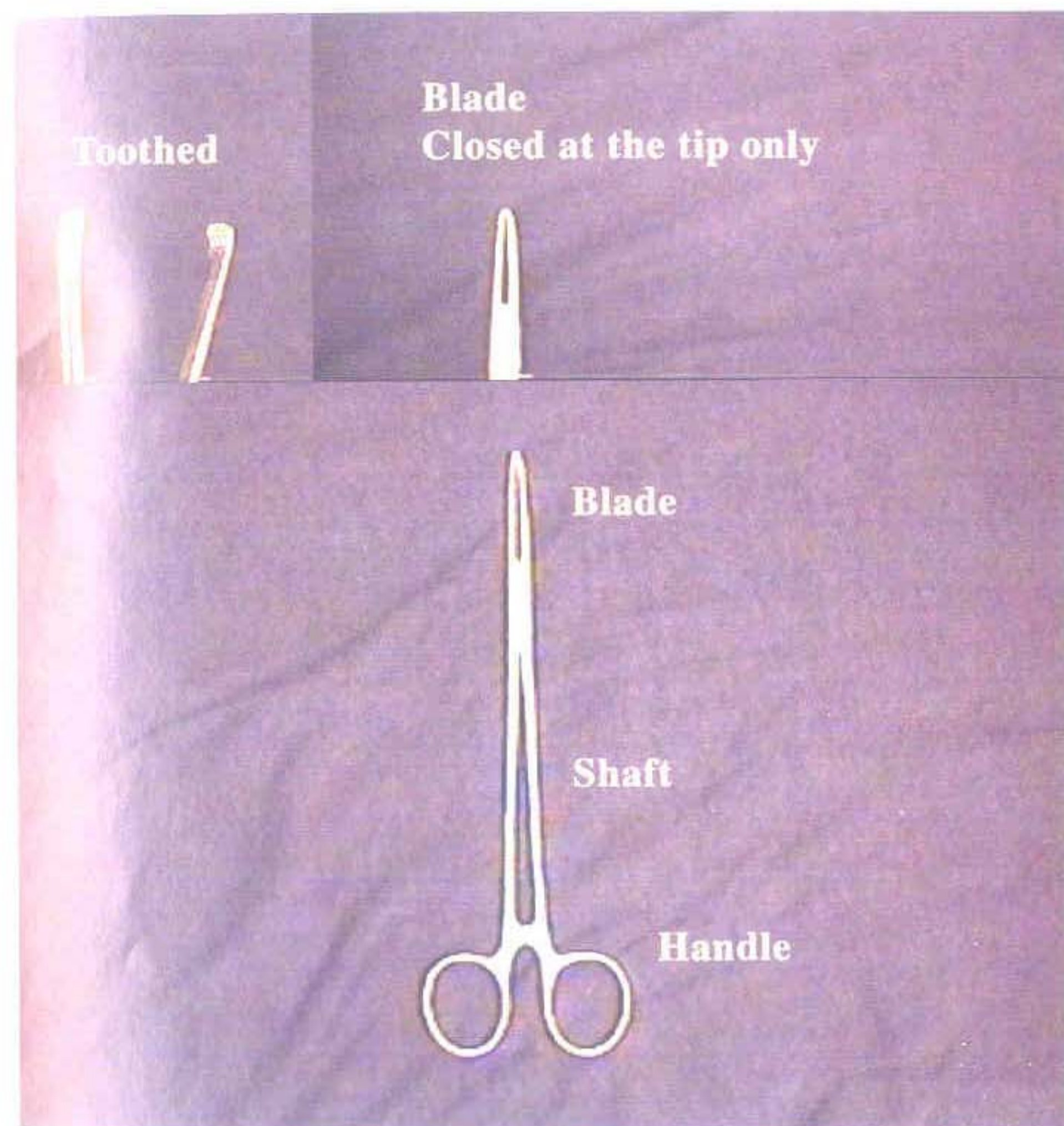
- 1- Scalp incision and eversion of the scalp to control bleeding .
- 2 -Thyroid surgery to help in dissection of the upper and lower skin flaps .
- We prefer to apply the Allis on the under surface of the skin .
- 3- Traction on the skin of the anal margin at 3, 7, 11 O'clock before picking up the hemorrhoids during operation .

B- Catch the meso-appendix in appendectomy Operation .

C- Catch the edge of the bowel in bowel anastomosis .

N.B:

- Its teeth are multiple and short to avoid marked crushing.

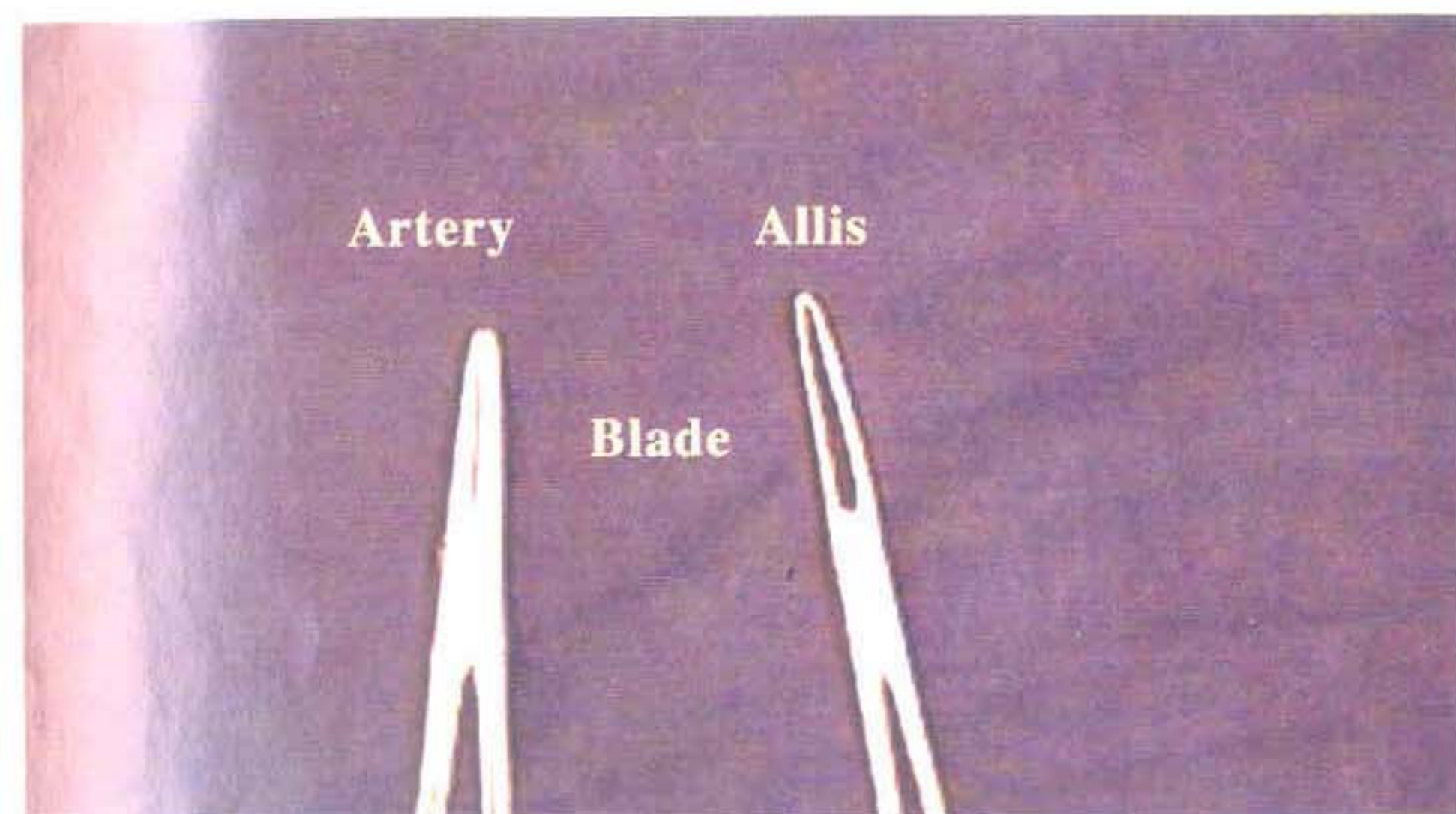


* What are the differences between artery & Allis blades ?

- 1- The space which present between Allis blades after its closure .
- We need only its tip for tissue grasping .
- 2- The presence of teeth on the tip of Allis blades .
- 3- No corrugation on Allis blades (smooth) .

N.B.

- It consists of:-Handle, shaft, blade, lock and joint similar to the artery but the differences present on its blades .



* What are the differences between Allis and Babcock blade ?

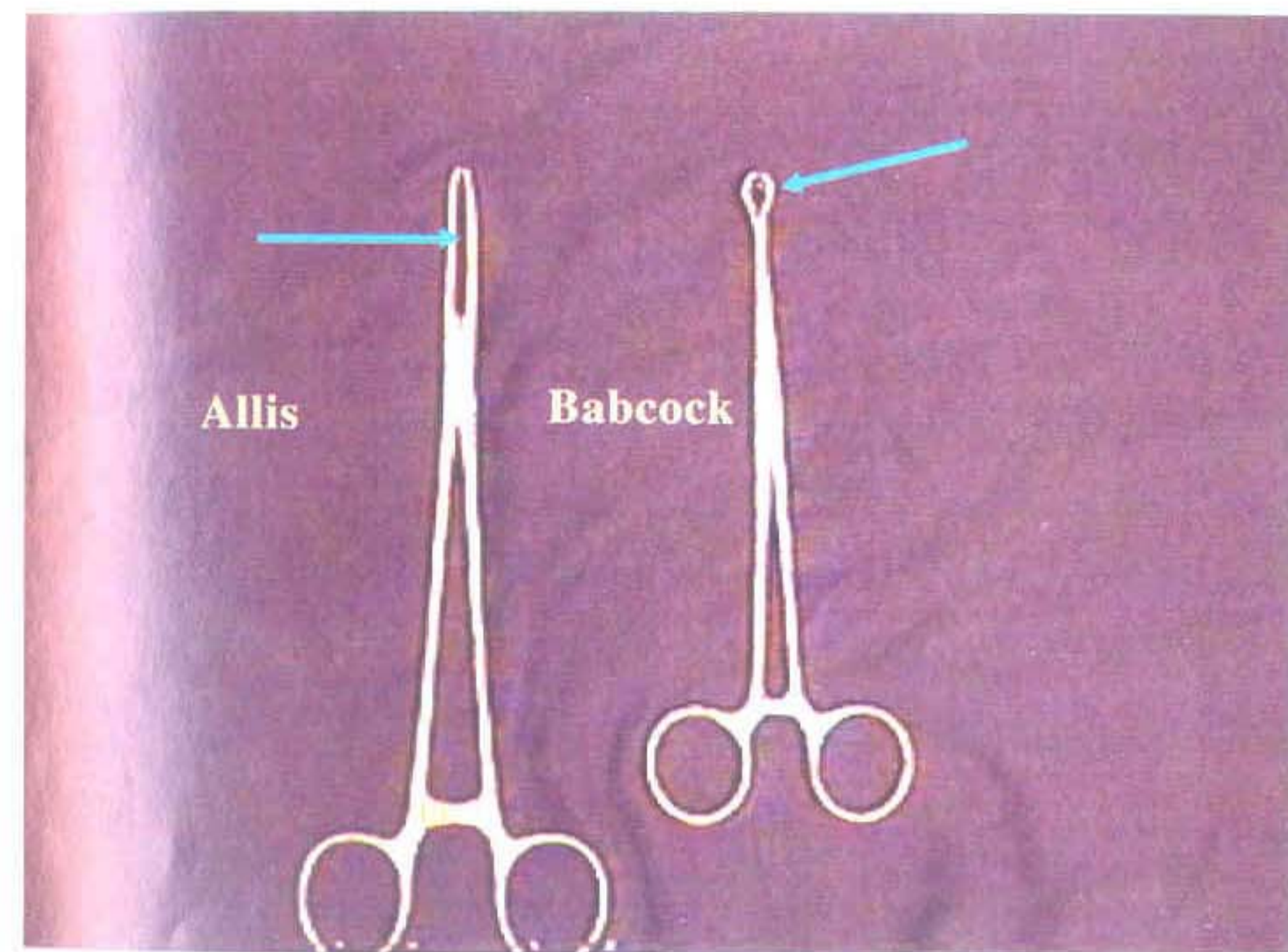
- 1- The tip of the Allis have a multiple small teeth but the tip of the of Babcock have a sharp edge .
- 2- The space which present between the blades in the Allis (Its blades do not touch each other) but this space present only on the tip of Babcock blades (Its blade close to each other near its joint) .

- We must remember that the Allis is less crushing than the Kocher but more crushing than the Babcock .

N.B.

- It consists of:-Handle, shaft, blade, lock and joint similar to the artery but the difference present on its blades .

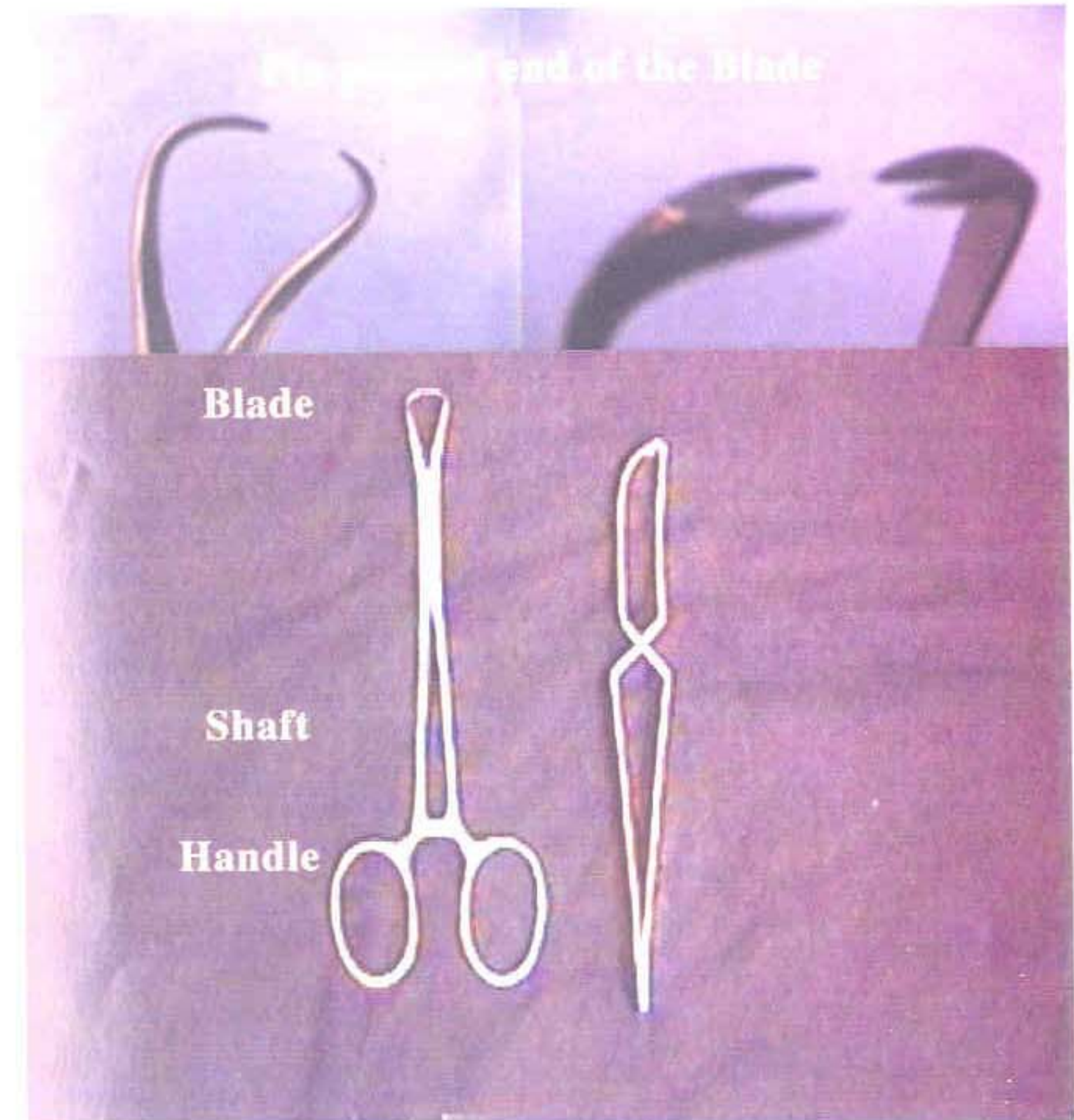
REVIEW OF SURGICAL INSTRUMENTS



10- Towel clips (clamp) :

- There is different shape of towel clips .
- Help in draping the area of the surgical incision by clip the towels with each others in accordance with the planned operative incision .
- In the operating theaters antiseptic solutions usually of an alcohol based as chlorhexidine or povidone iodine (Betadine) used for skin preparation of the operation sites, then we apply towel which hold with towel clips .

REVIEW OF SURGICAL INSTRUMENTS

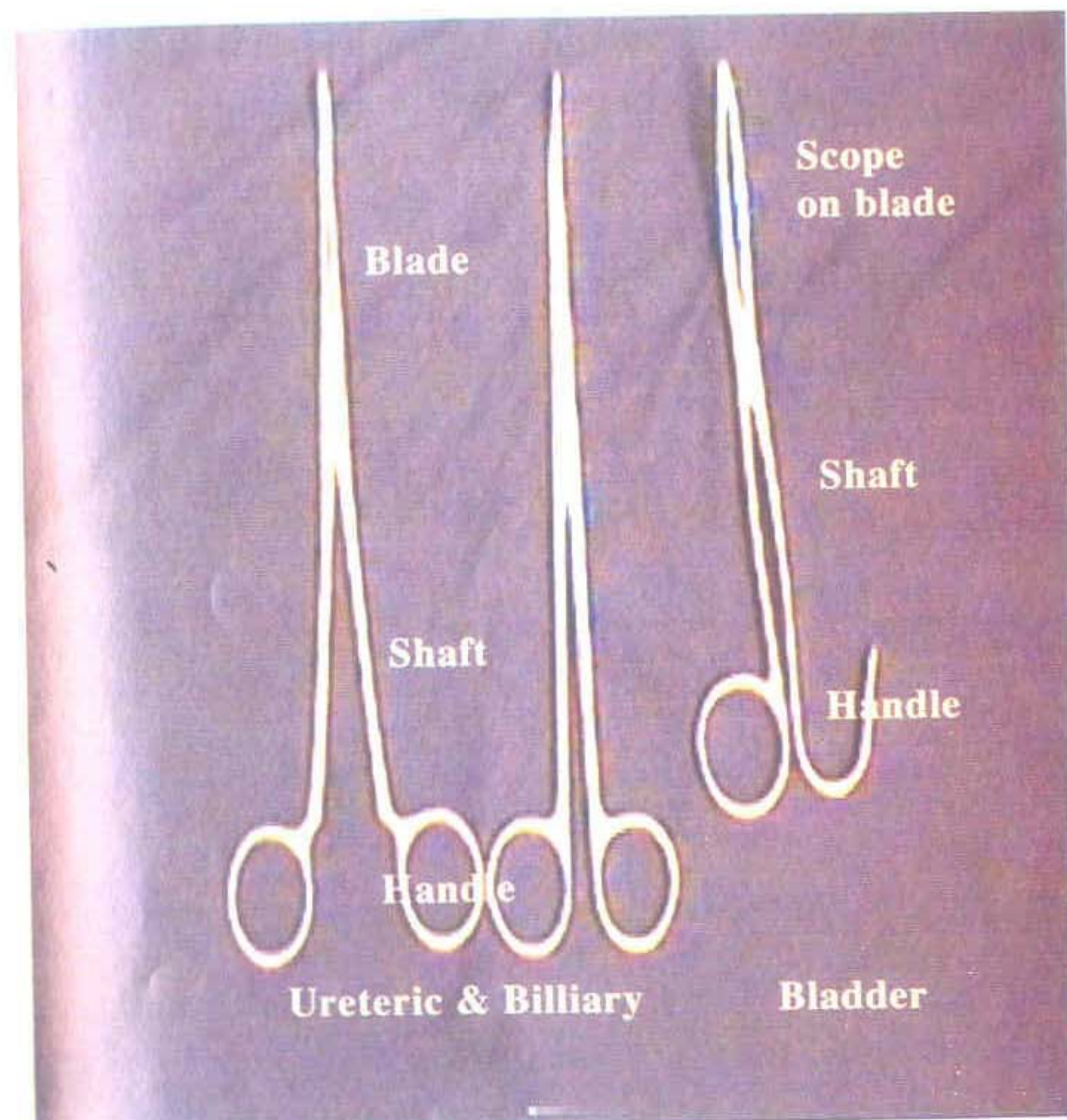


B- Instruments without lock

1- Stone forceps :

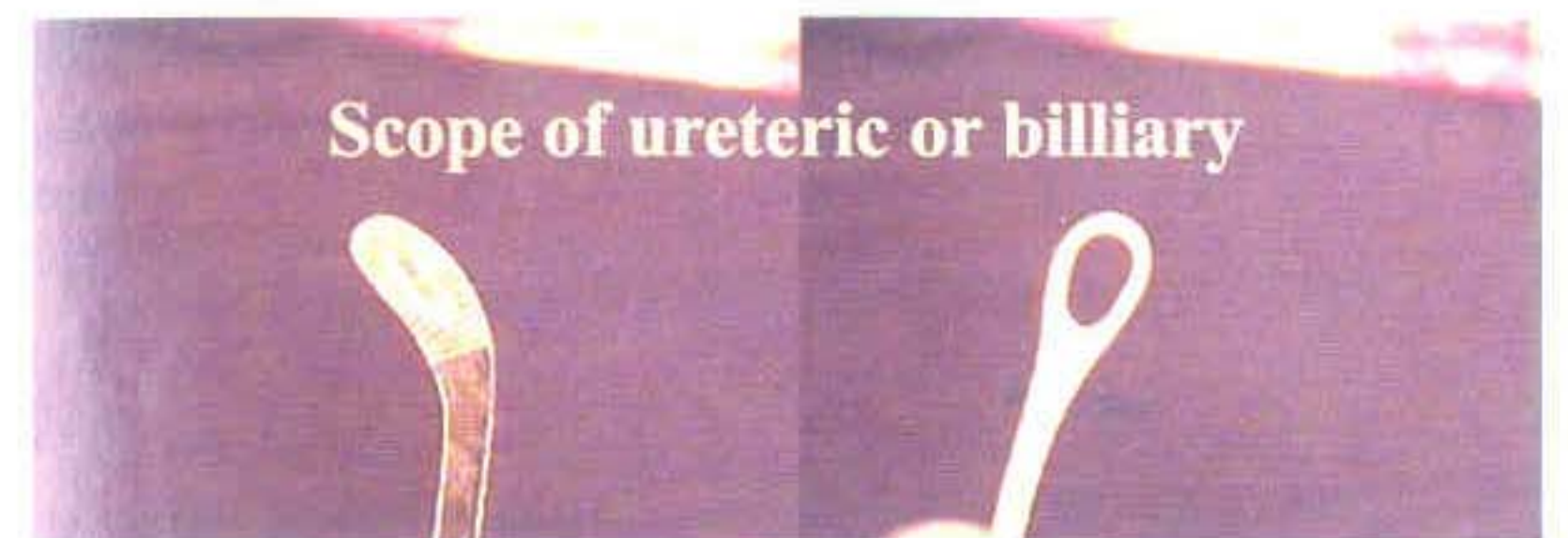
What are the types of stone forceps ?

- 1- Ureteric & biliary stone forceps .
 - For extraction of the stone from the ureter, renal pelvis or calyces and common bile duct.
- 2- Bladder stone forceps.
 - For extraction of the stone from the urinary bladder and sometimes from the gallbladder.



What are the differences between bladder and ureteric stone forceps ?

- 1- The scope of bladder forceps present all over the blade, large and oval but of the ureteric forceps present on the tip of the blade, small and rounded, open or closed.
- 2- Handle of the bladder forceps is opened at one side to accommodate the 4 fingers and for good grip .



2- Scissors :

A- Tissue dissecting scissor used for dissection or cutting the tissues .

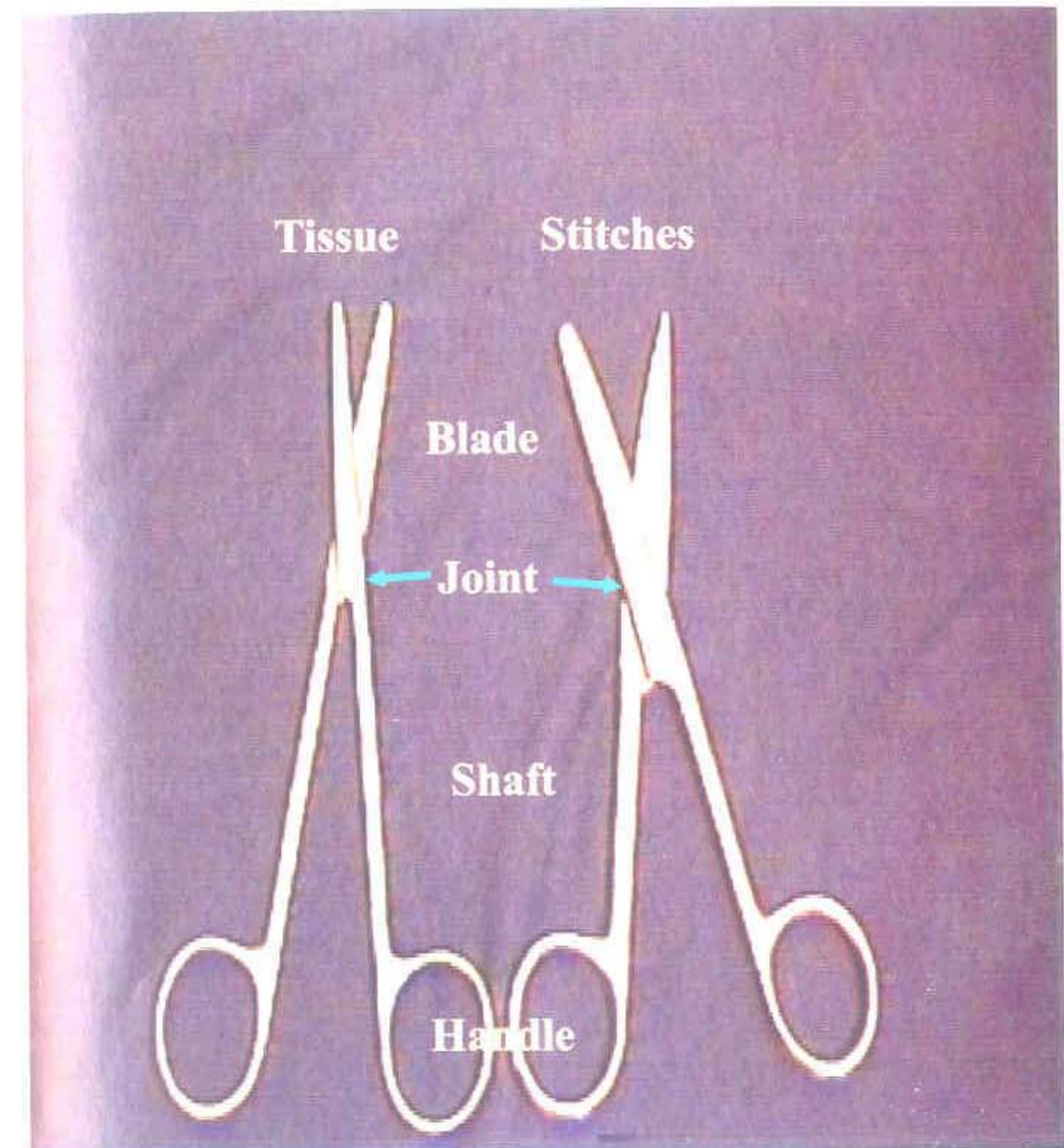
- Skin undermining to form skin flap .
- Opening parietal peritoneum after elevation by two artery in abdominal Operations.
- Cutting the peritoneum over Calot,s triangle before cystic duct and artery Ligation .
- Cutting the vessels after ligation .
- Making v-shaped cut on either side of hemorrhoid pedicle before Transfixion ligation and excision .

N. B.

- The previous uses are just examples .
- Some scissors with pointed blades and others with rounded blades .

B- Stitches scissor with small notch at the terminal part of one of its blades or of pointed blade, used for removal of the stitches. But those without notch used for cutting threads after tissue ligation .

C- Gauze scissor: Used for preparation of gauze for dressing and sometimes as stitch scissor.



3- Bone cutting forceps :

- Used in:

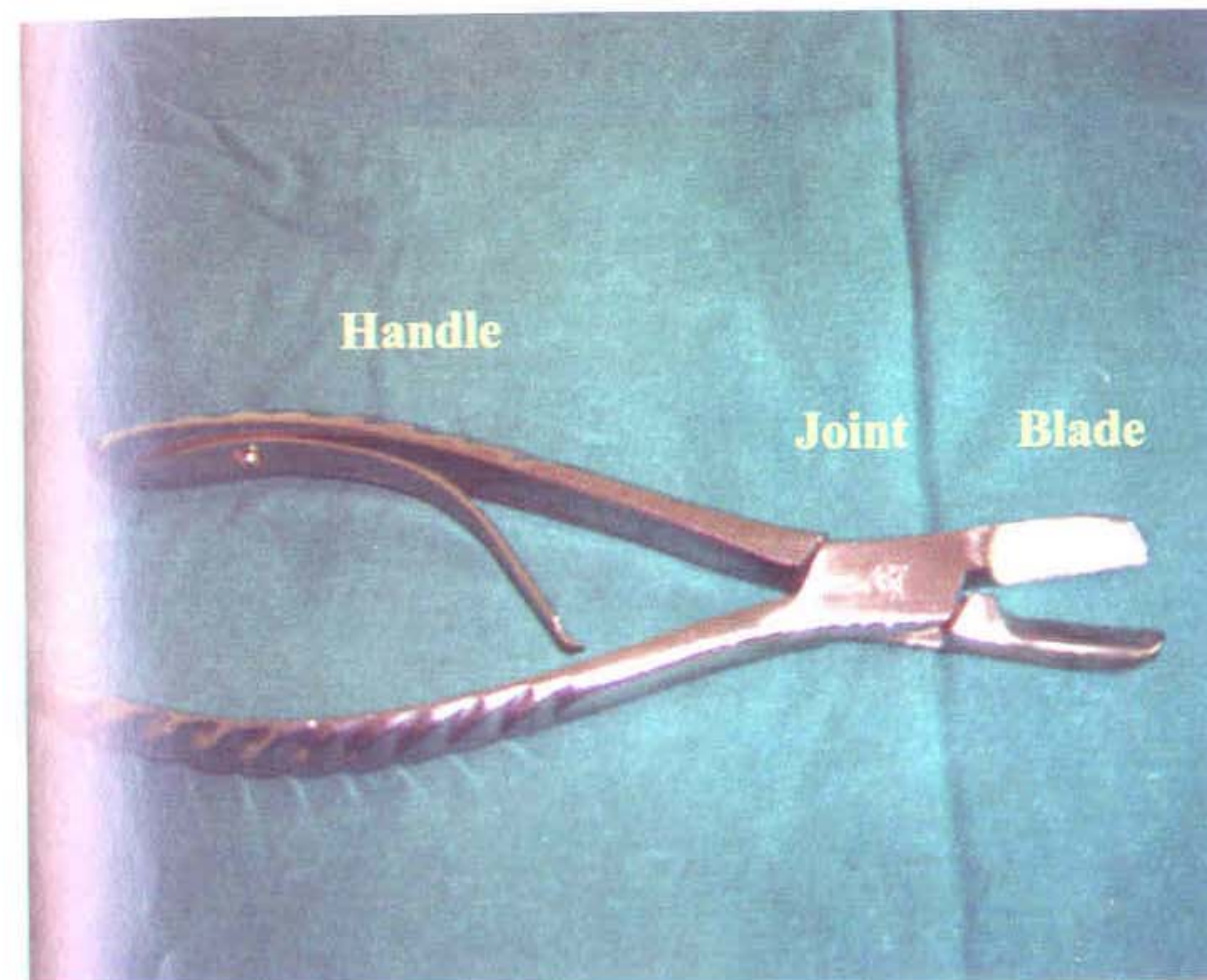
A- Cutting small bone as in toes or fingers amputations .

B- Cutting ribs from its beds in cardio-thoracic operations .

C- Circumcision (Bone cutting method) .

N.B.

- Sometimes it consider from scissors group .



II- NONE ARTICULATING.

Means without joint

1- Retractors :

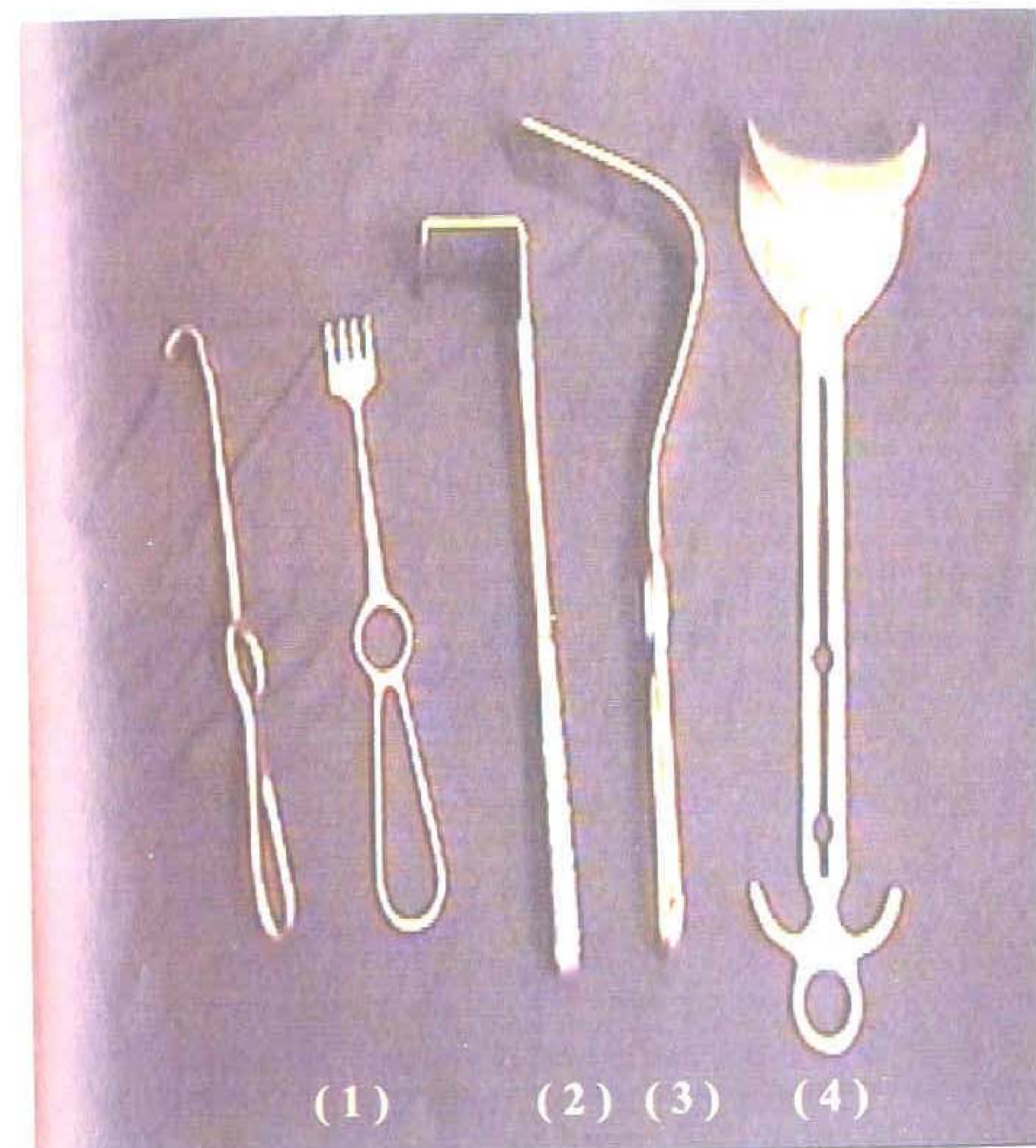
What are the types of retractors?

A- Non-self retaining:

- These retractors need continuous traction by the assistants or by nurses during operation, some of these retractors have oval opening on their handle to be attached to the operating table to put it in maintained traction .
- Each retractor consists of long handle and blade .
- The retractors with long handle and short U shaped blade (No 1,2 and 4) used for abdominal wall retraction, the small one in a small incision as Grid-iron incision of appendectomy and the large one (No 4) for large incisions as exploratory incisions or in splenectomy .
- The retractors with long handle and long flat wide blades (No 3) uses for liver and for retraction of abdominal viscera .

N.B :.

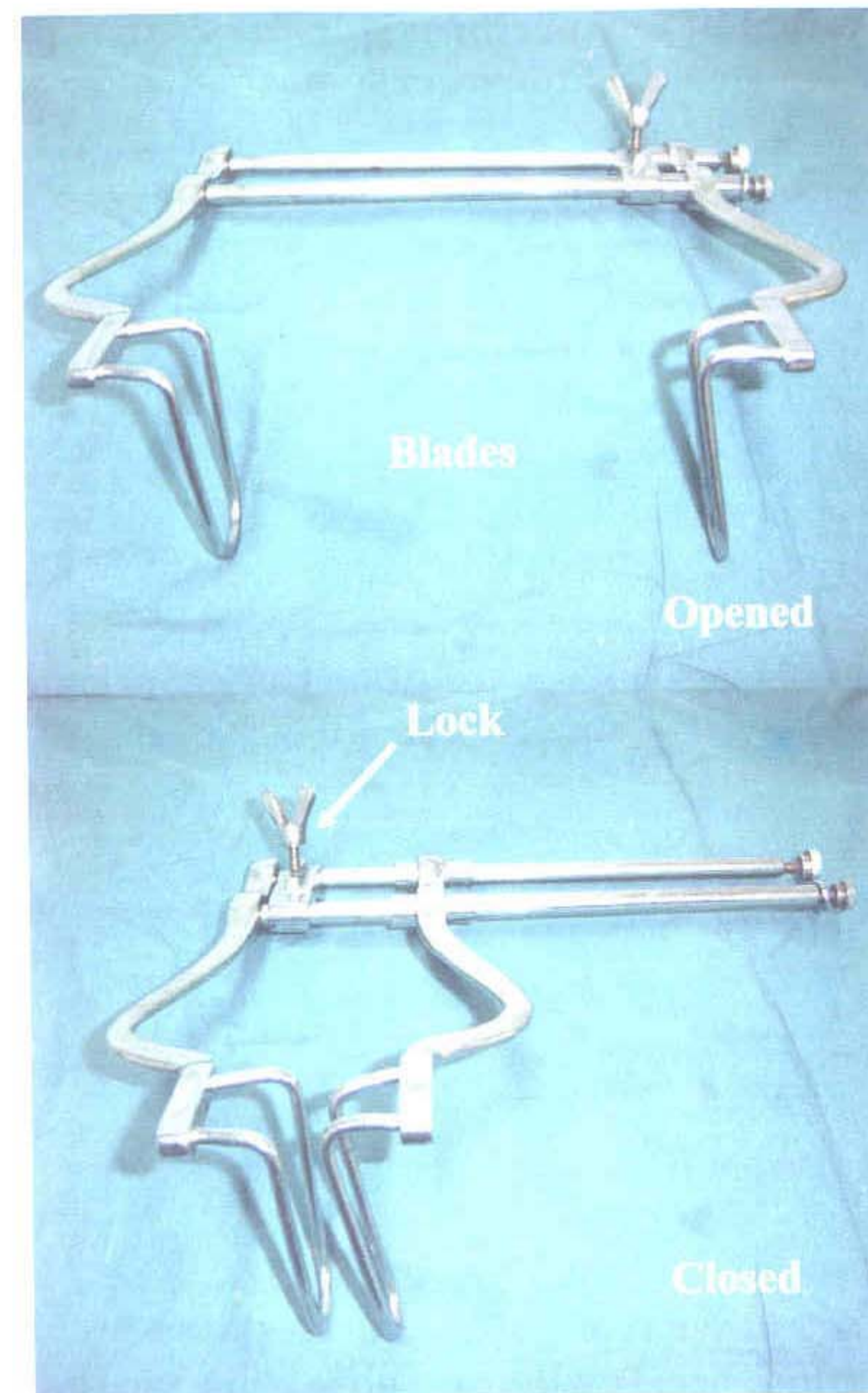
- Blade of the small abdominal wall retractors may be Fork – like (Volkmann) or flat (Langenbeck) .
- There are some small retractors with central handle and two blades at both ends .



B- Self- retaining retractors :

- Do not need traction by the assistants or by nurses .
- With a long two blades to retract the abdominal wall and the viscera at the same time .
- With rounded edge blades to avoid injury to the viscera.
- With a lock to adjust and maintain traction at desired space and prevent their closure during operation .

N.B. – There are a small self-retaining retractors for skin retraction only used in thyroidectomy .



2- Dilators :

What are the uses of the dilators ?

- 1- Dilatation of any urethral stenosis as that present after surgical treatment of hypospadias or after traumatic repair .
- 2- Dilatation to external urethral orifice .
- 3- Dilatation to the anal stenosis pre or postoperative.
- 4- Introduced inside the ureter up and down during the operation to dilate stenotic segment and to exclude the presence of any residual stones after uretrolithetomy .
- 5- Introduced inside the common bile duct to exclude the presence of any residual stones after choledocolithetomy .
- 6- Introduced inside the sphincter of Oddi to do sphincterotomy or sphincteroplasty over it .

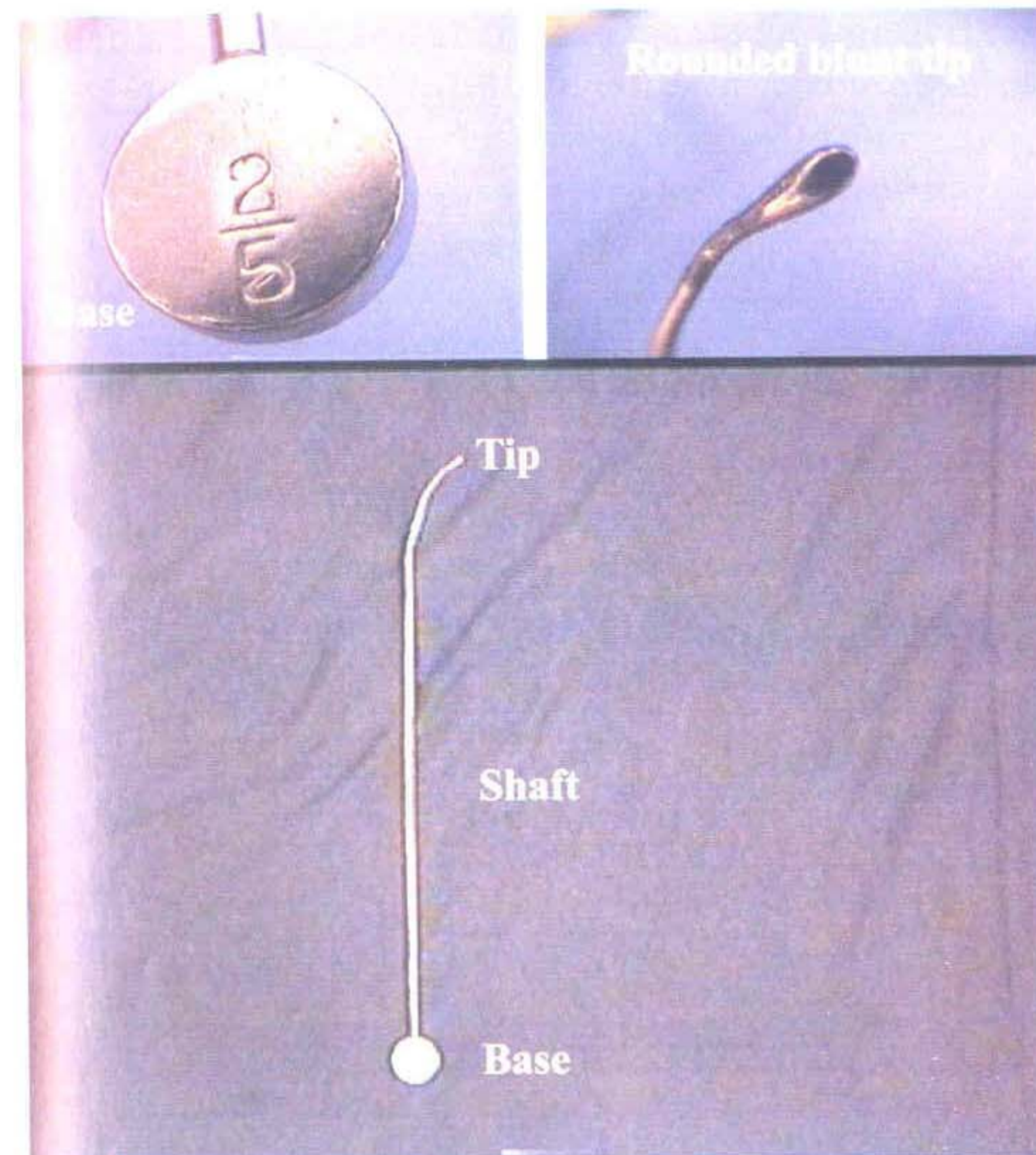
What are the characters of urethral or biliary dilators?

They are characterized by :

- 1- Blunt rounded tip to avoid injury to the wall of dilated or explored tube .
- 2- Rounded base for recording the dilator size to facilitate their choice during the up or down grading dilatation .

N.B:

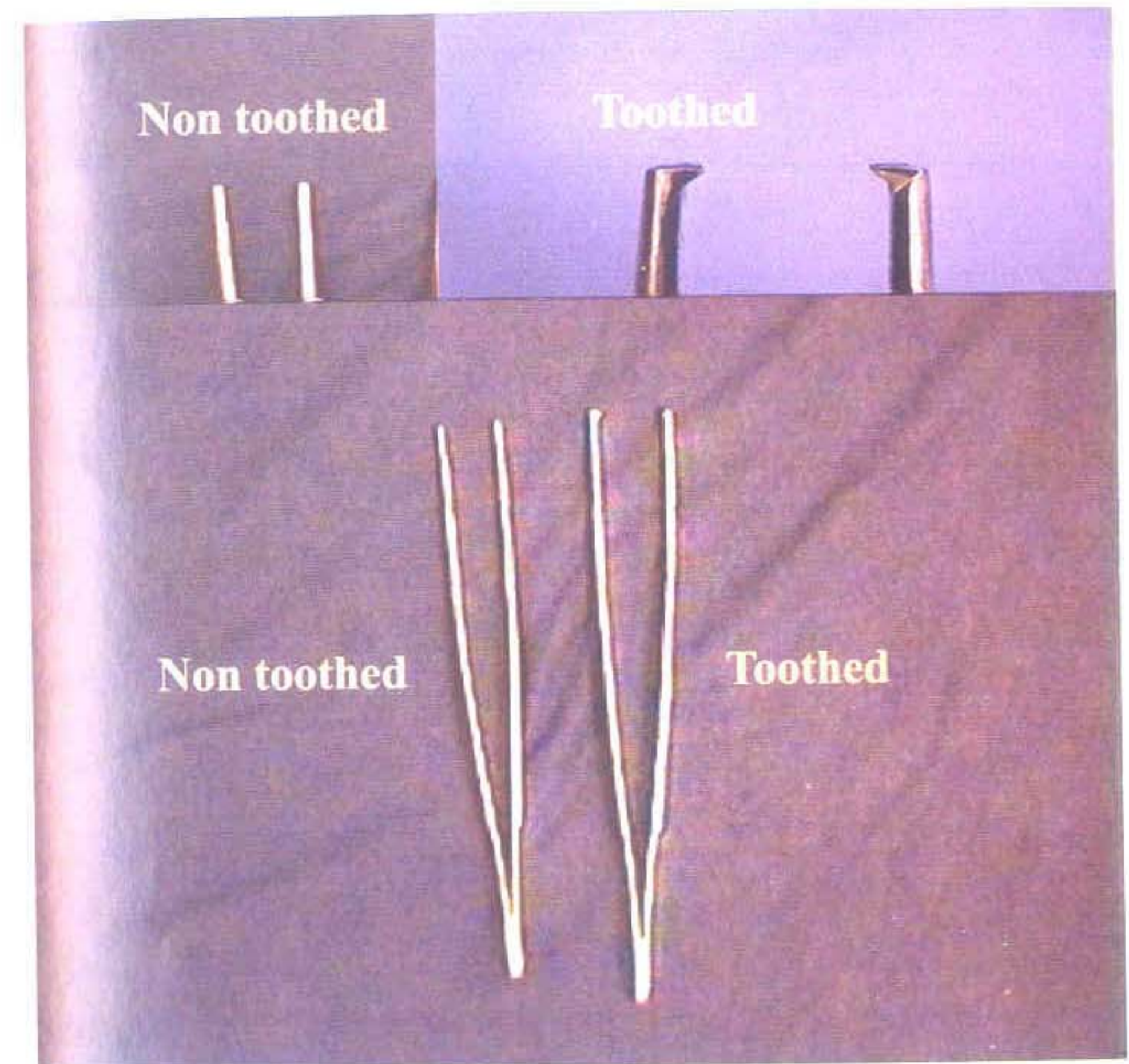
- There are other types of dilators as used for anal dilatation, cervix dilator, rubber dilator for esophagus and dilators used by endoscopy .



3- Tissue forceps :

What are the types of tissue forceps?

- A- Non toothed forceps: Non traumatized used for catching fine structures as intestinal wall during anastomosis, bladder wall during repair or common bile duct in biliary operations .
- B- Toothed forceps (2x1): Traumatizing for catching tough structure as skin during skin closure in any operation, tendon or sheath as external oblique apenurosis in appendectomy and inguinal hernia repair ,muscles of the abdominal wall in all abdominal operations .
- The teeth give the forceps a good grip .



4- Fistulae director :

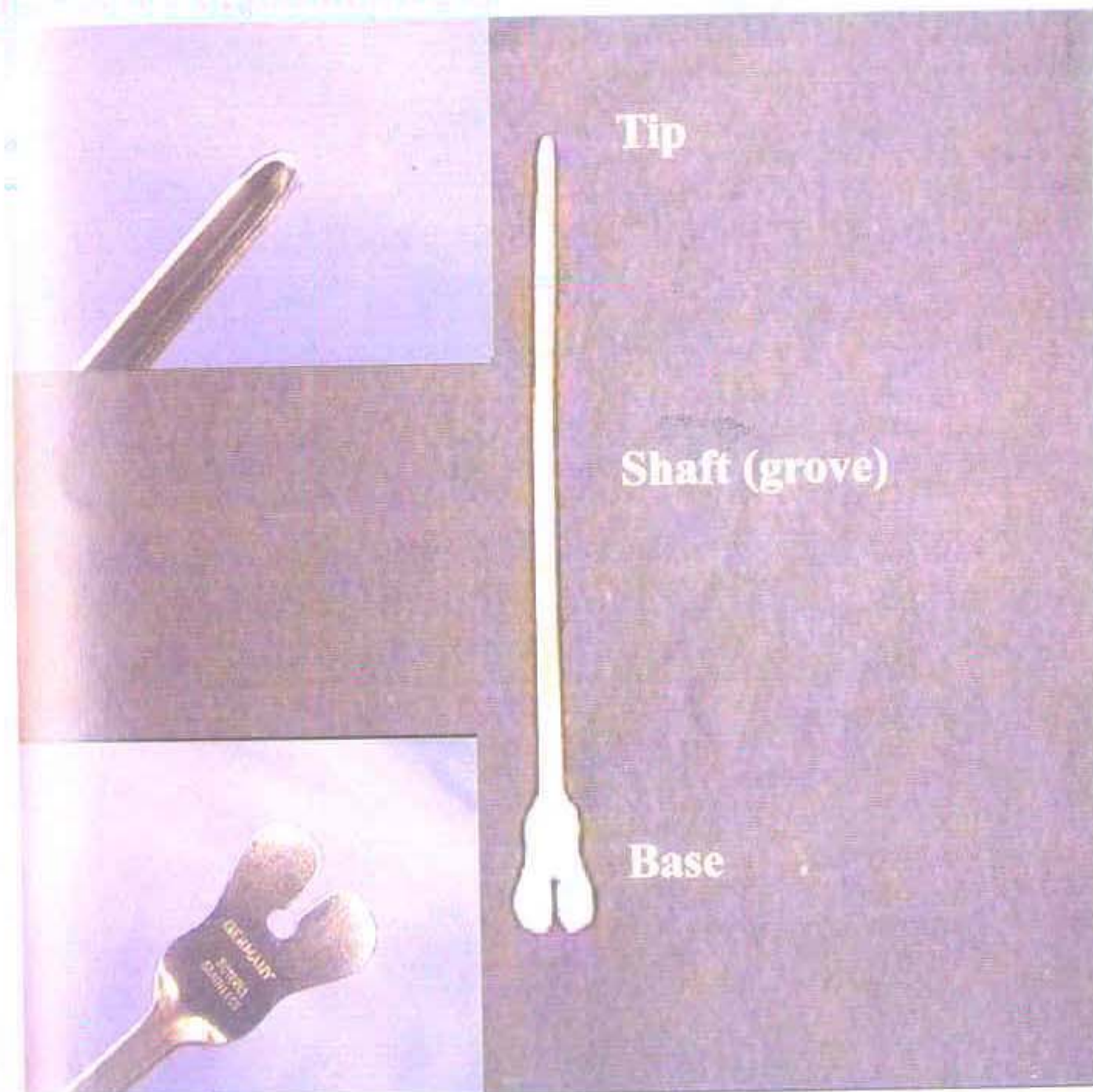
What are the characters of fistulae director ?

- Have blunt tip to avoid injury or false passage during introduction.
- Have a groove on its shaft to put the blade of scissor or the scalpel inside it.

What are the uses of fistulae director?

- 1- Probing the fistulae tracts before fistulotomy.
- 2- Introduce inside the constricting hernia ring in complicated hernia repair.
- 3- Its handle may used in cutting the band of tie tongue to protect the floor of the mouth from injury.

REVIEW OF SURGICAL INSTRUMENTS



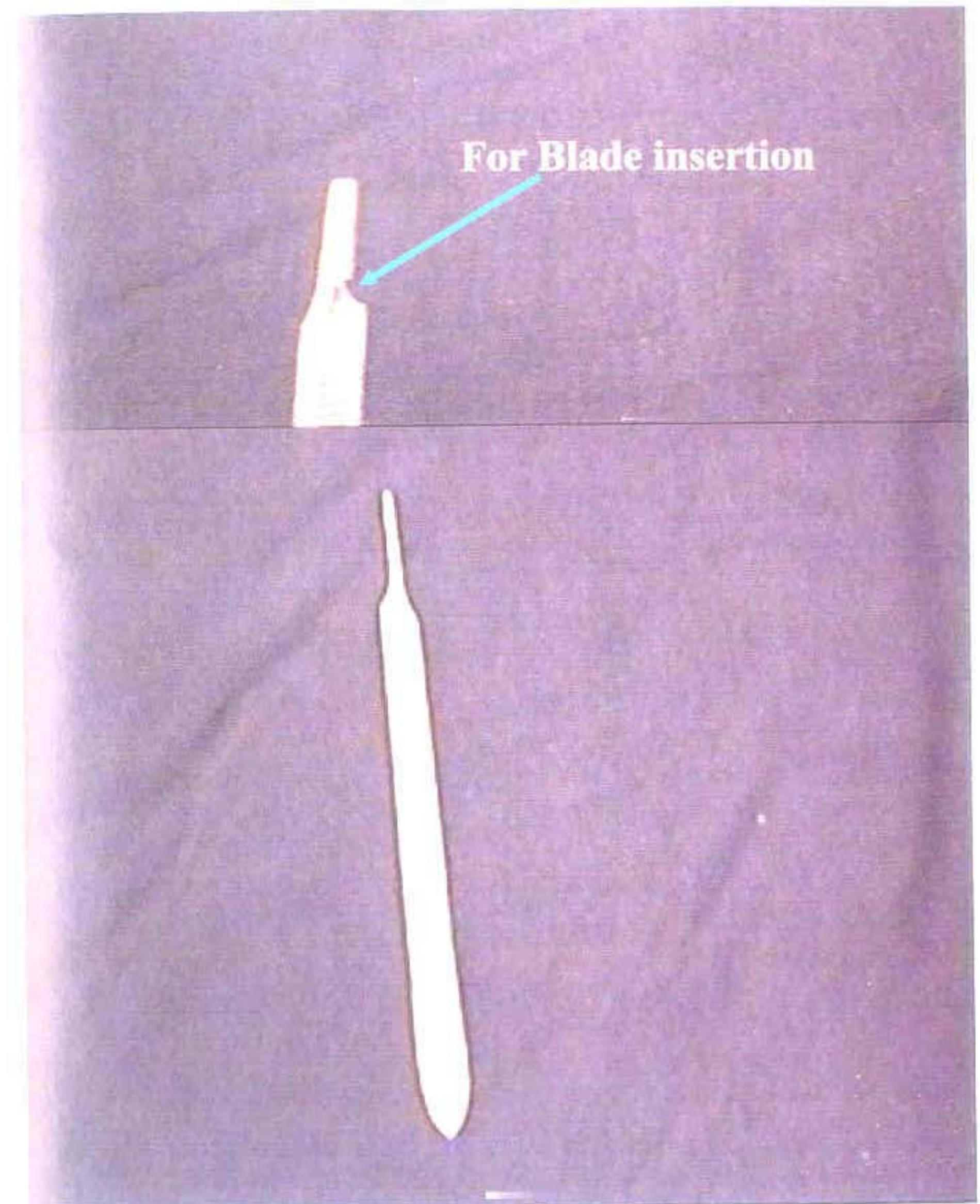
5- Scalpel handle :

- There are two types of scalpel handle

- 1- Size 15 handle (small): Used for insertion of 10, 11 or 12 blades.
- 2- Size 20 handle (large): Used for insertion of 20, 21 or 22 blades.

N.B.

- Corrugation on the handle to produce a good grip to the scalpel .



6- Rib dissector (Raspatorie) :

- Consists of three parts :

- 1- Spindle shaped irregular handle .
 - 2- Shaft between handle and blade .
 - 3- Blade(U-shape) with flat inner surface and rounded outer surface .
- Used for separation of the ribs from their beds before cutting by bone cutting scissor in cardio-thoracic operations .
- There are one right and one left according to the direction of its curve.

Encircling the
rib



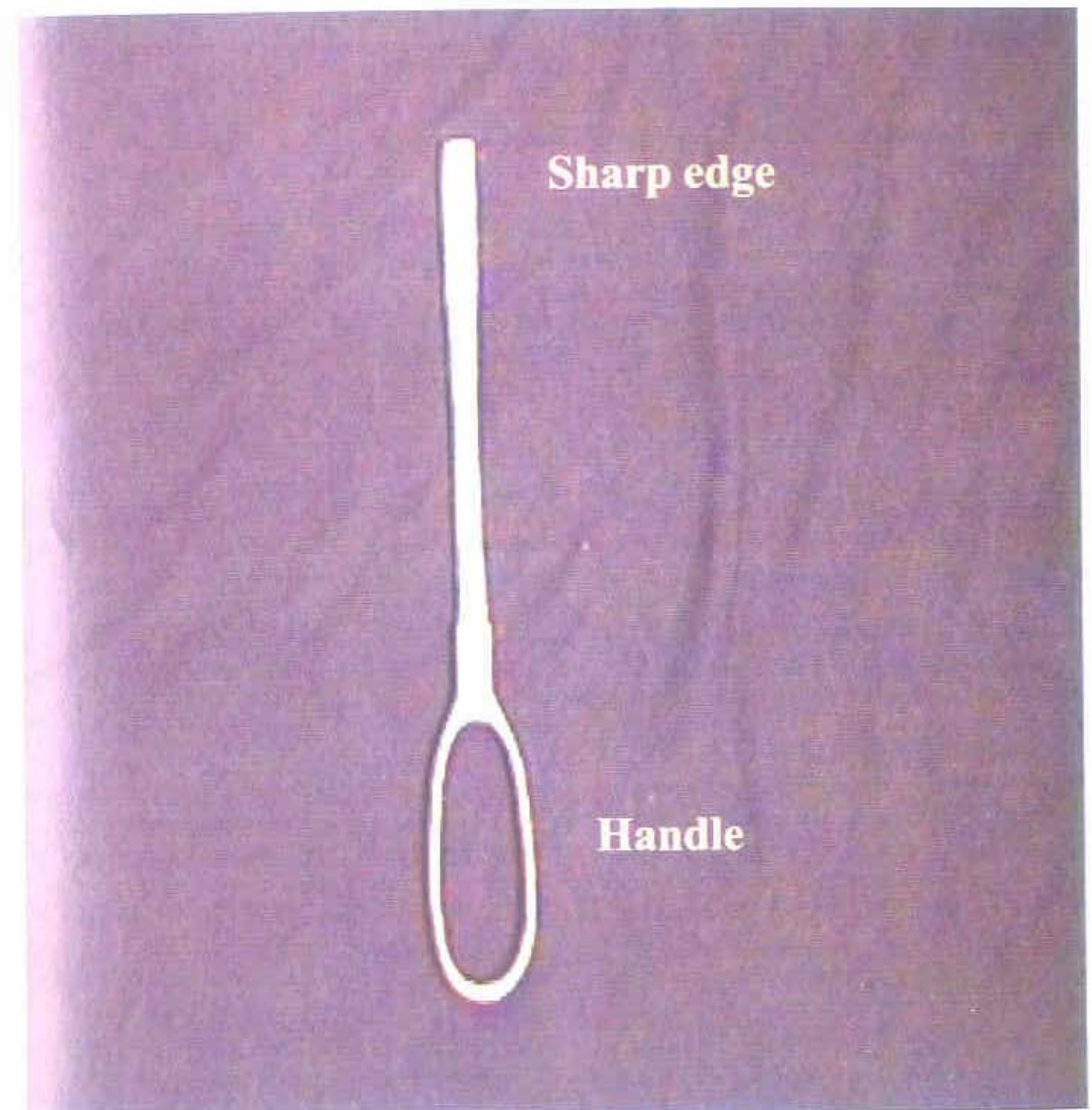
Handle



7- Periosteal elevator (Chisel) :

- Consists of three parts :

- 1- Handle .
 - 2- Shaft between handle and blade .
 - 3- Blade with sharp edge (knife-like) .
- Used for elevation of the periostum away before bone resection as in amputation operations and skull surgery .



8- Aneurysm (Ligature) needle :

- Consists of three parts :

1- Handle .

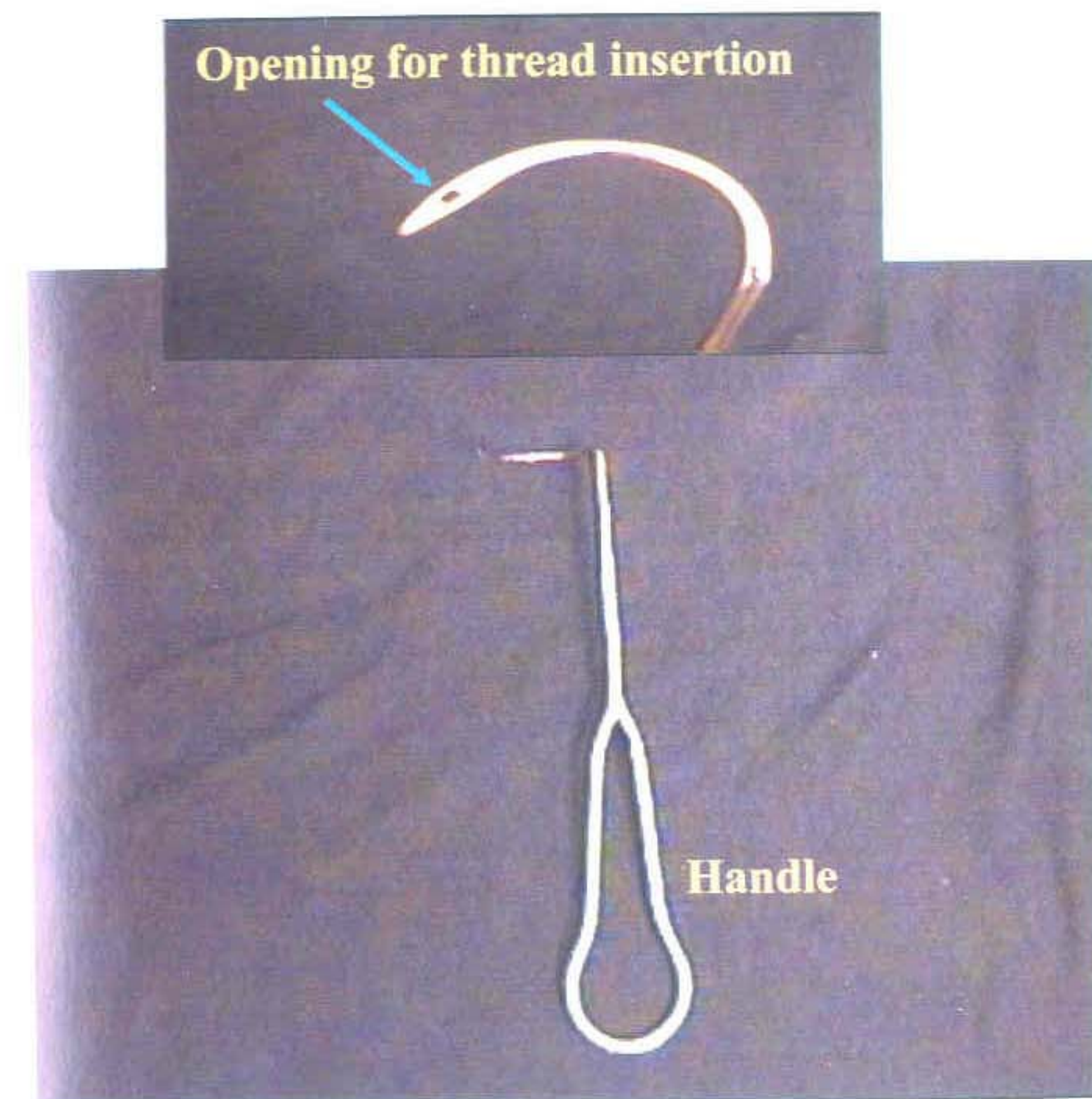
2- Shaft between handle and blade .

3- Blade (U-shape) with eye at its terminal end .

- Used for encircling a vessels or tubular structures with a thread before their ligation .

N.B.

- It simulates the Rib dissector (Raspatorie) to some extent, so we must notice the eye present at its blade .



9- Proctoscope :

- Consists of:

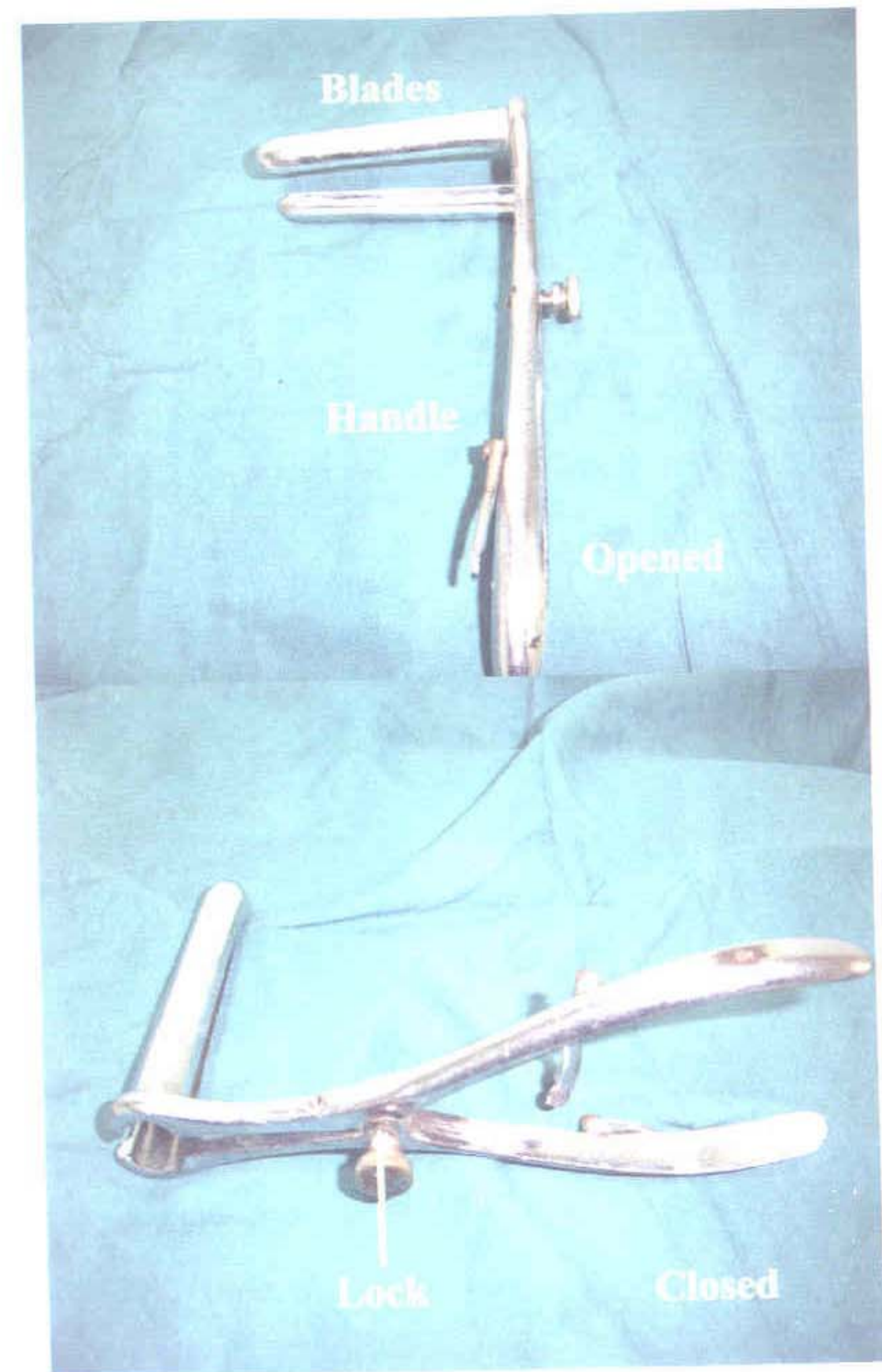
- 1- Handle:- Vertical in position, two similar parts, have spring in between to adjust the opening of the blade and lock to maintain this adjustment .
- 2- Blades:- Horizontal in position, introduces inside the anus and acts as retractors when they open by the handle, may be two or three in number. We introduce it close then we open it inside the anus .

What are the uses of proctoscope?

- 1- Used for inspection of the anal canal, ano-rectal junction and the lower rectum up to 10 cm .
- 2- For exploration of the anal canal and lower rectum before surgery for chronic anal fissure and hemorrhoids for diagnosis of any associated lesions .
- 3- Help in taking a biopsy from anal canal and rectum .

What are the positions of proctoscopic examination?

- 1- Sims position with the buttocks elevated on a small cushion .
- 2- Knee- elbow position .



10- Curette spoon (Bone curette) :

- Consists of two parts:

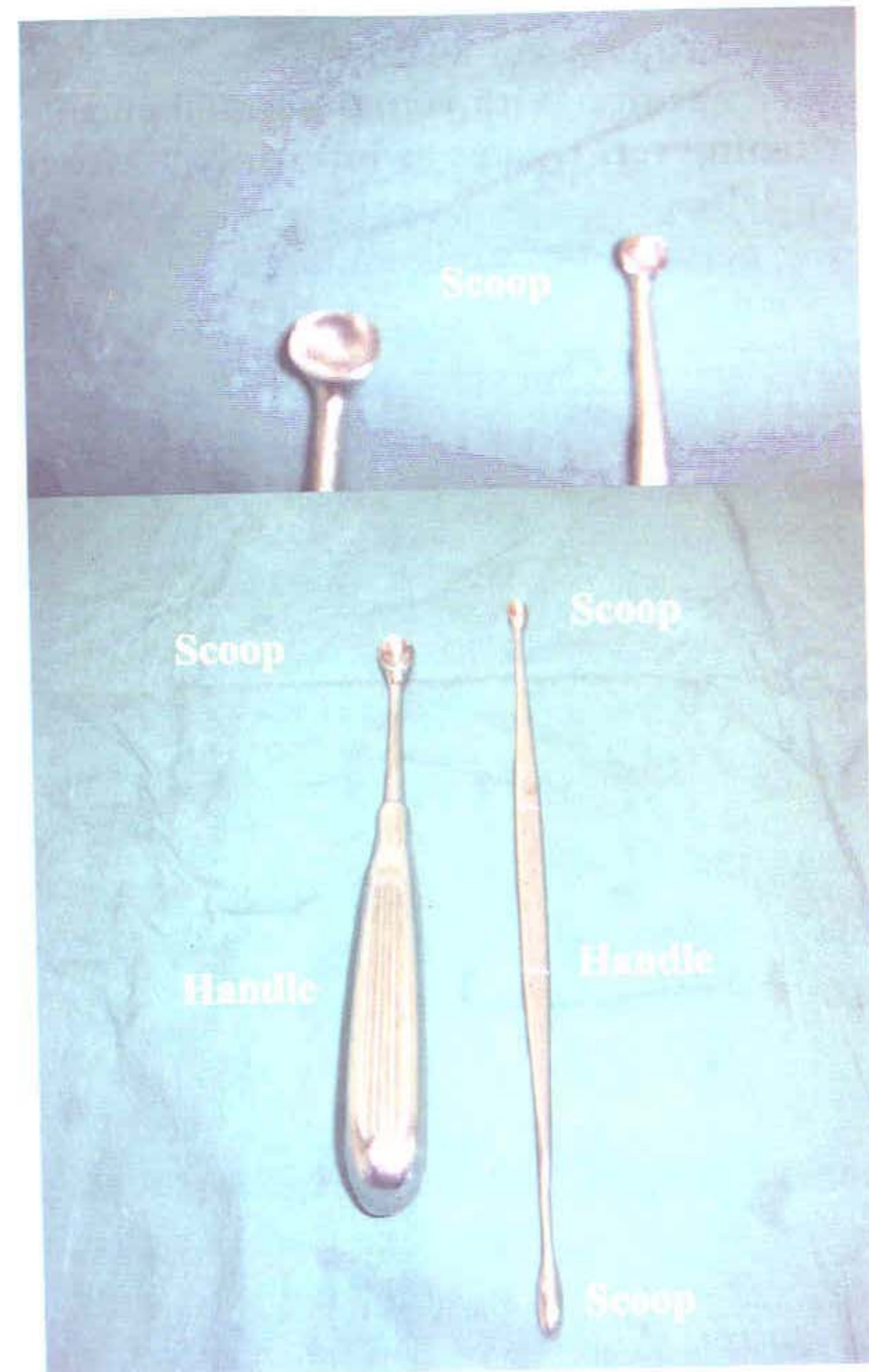
1- Handle.

2- Sharp scoop.

- Used in curetting a necrotic tissue from the floor of chronic leg ulcers (Varicose , diabetic.....act.) and the sequestrum of chronic osteomyelitis .

- There are different sizes from the spoon .

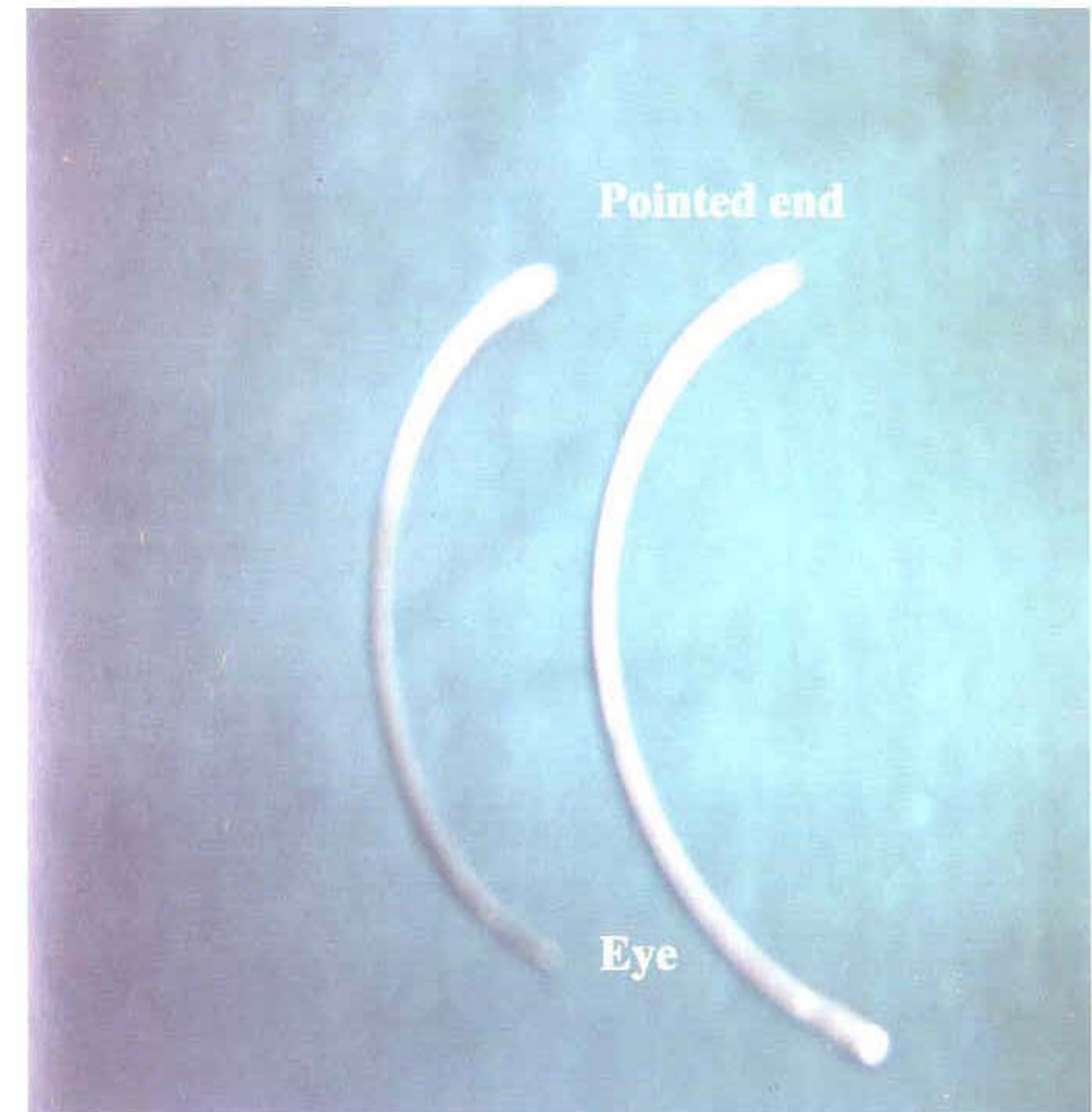
- Sometimes the handle present between two scoops.



11- Needles :

- There are two types of needles.

- 1-Rounded needles(With round pointed end) used for stitching soft tissues as intestine, peritoneum and muscles .
- 2-Cutting needles(With triangular pointed end) used for the skin closure.



III- RUBER INSTRUMENTS

1- Drains :

What are the types of drains ?

A-Corrugated rubber drain :

Advantages:

- 1- Simple .
- 2- Not expensive .
- 3- Easy application and removal .

Disadvantages :

- 1- Introduce infection from outside.
- 2- We can not measure the amount of discharge.

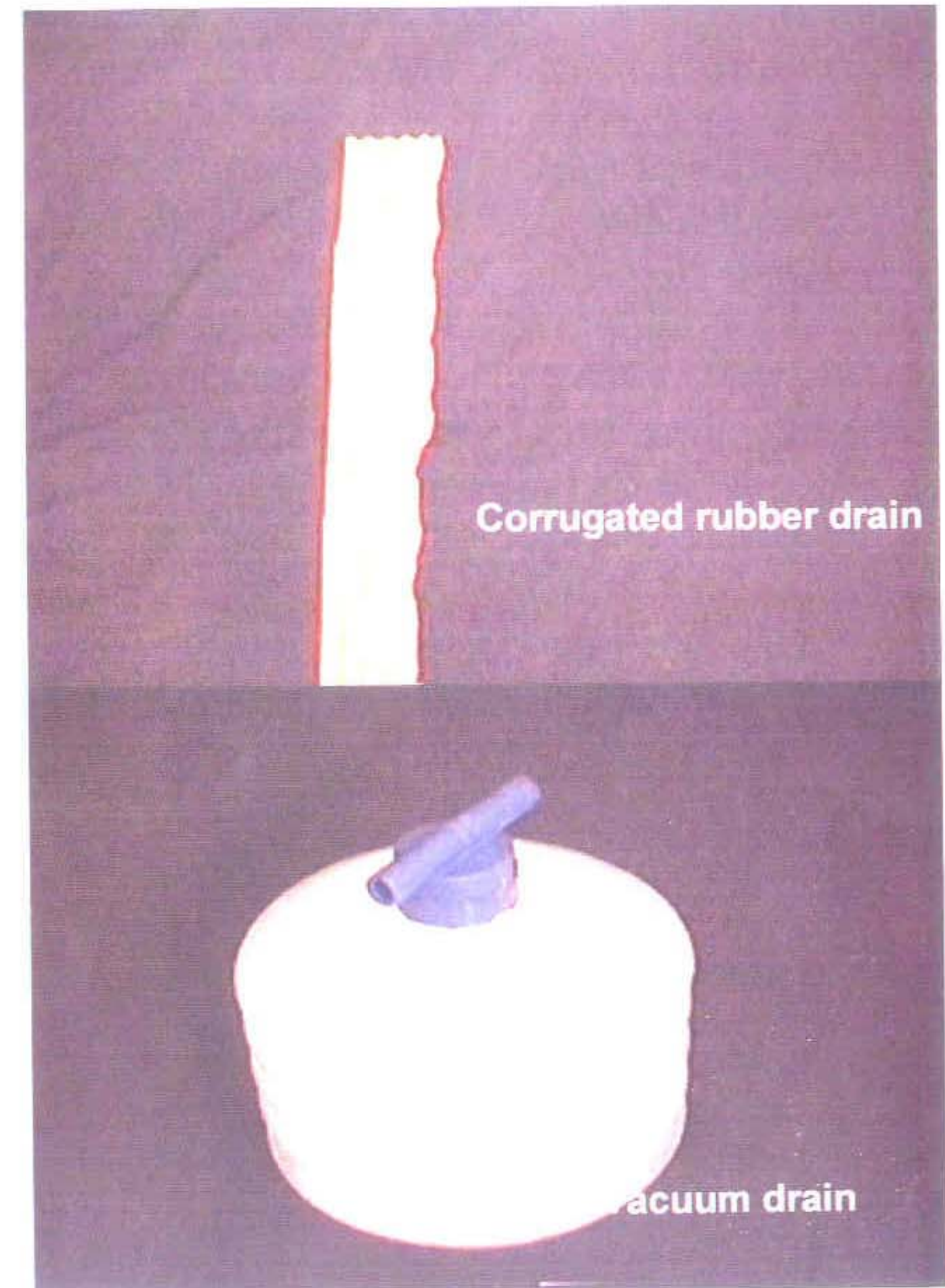
B- Vacuum drains (Negative suction drain) :

Advantages:

- 1- Closed system, no infection from outside .
- 2- Measure the amount of discharge .

Disadvantages :

- 1- Visceral injury if present intra-peritoneal by negative suction.
- 2- Expensive .



Corrugated rubber drain

vacuum drain

*Other types of drains :

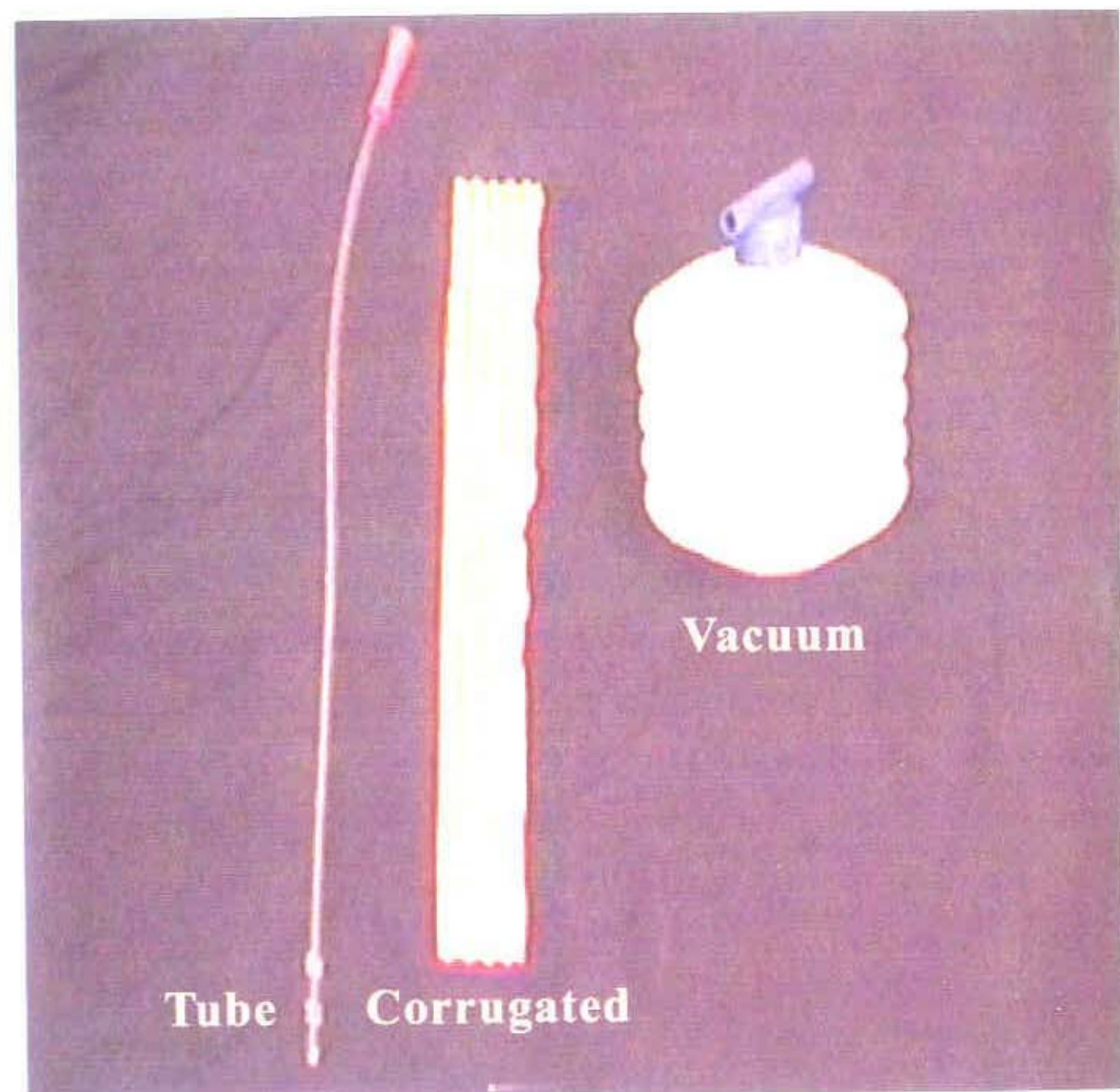
- Sump drain .
- Tube drain by Nelaton catheter .

What are the Indications of drains?

- 1- To drain pus as: From abscess cavity, perforated appendix and peritonitis.
- 2- To drain blood as from oozing surface as after mastectomy and splenectomy.
- 3- To drain expectant discharge at the area of operation as serous in incisional hernia, bile in biliary surgery and intestinal content in resection anastomosis.
- 4- To diagnose postoperative internal hemorrhage if occurred as after splenectomy.

When we remove the drain?

- When the discharge become less than 30 cc/24hours.



4- Fluid infusion sets :

Consists of :

- 1- Bulb. With pointed part to introduces into the fluid bottle. To show the rate of infusion .
- 2- Lock. For adjustment of fluid infusion rate .
- 3- Tube .
- 4- Needle .

Used for: Intravenous infusion of any fluid as glucose and saline .

What are the differences between fluid and blood infusion sets ?

Blood transfusion set with :

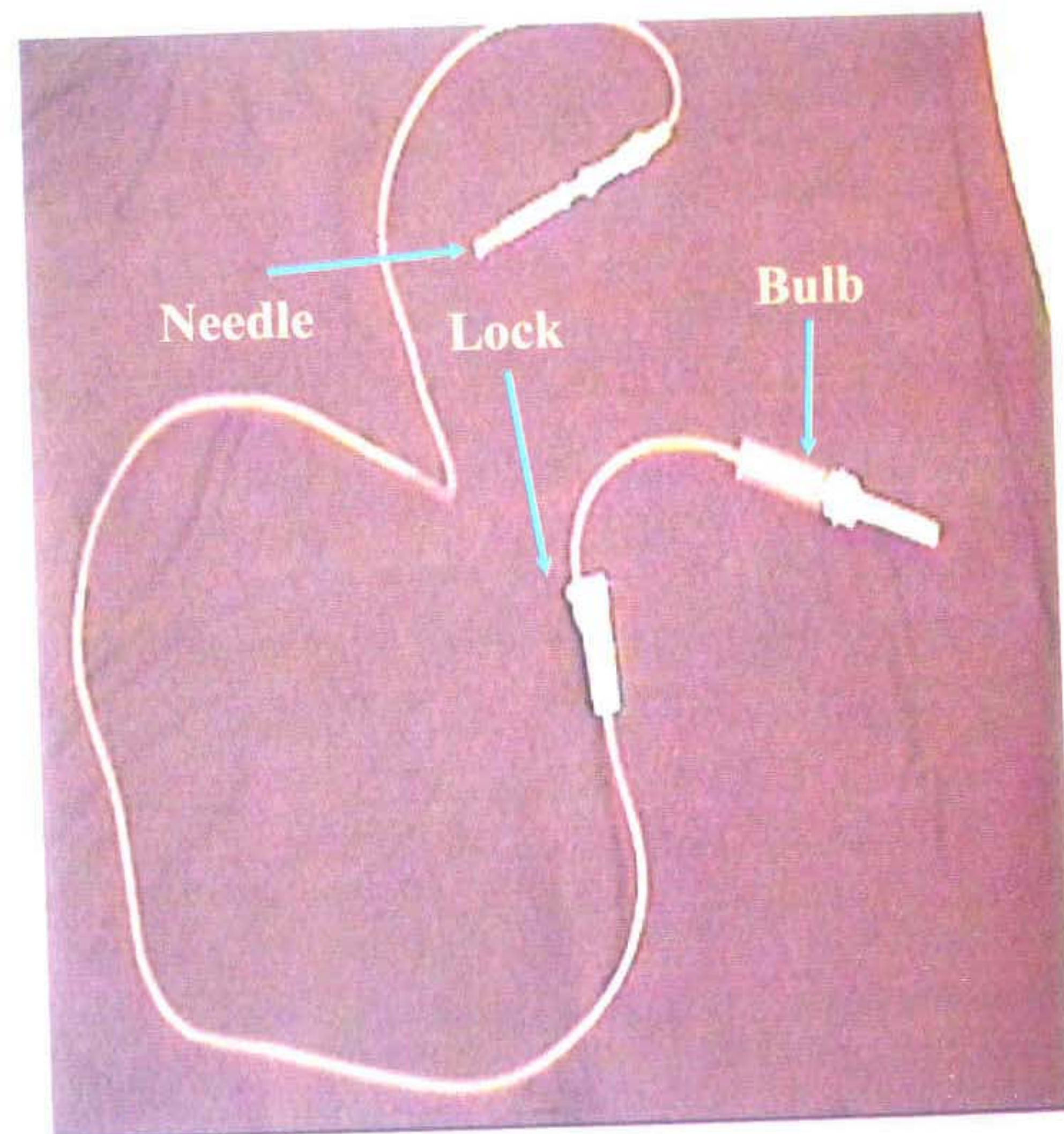
- 1- Wide bore needle to avoid its obstruction and to give rapid flow.
- 2- Filter inside its bulb to prevent fine clots .

What are the indications of fluid transfusion?

- 1- Early postoperative, especially after major operations till return of intestinal movements .
- 2- Intestinal obstruction to avoid vomiting and abdominal distention .
- 3- Dehydration as results of fluid losses, as caused by severe vomiting.
- 4- Shock.

What are the indications of blood transfusion ?

- I- Whole blood :
 - In severe blood loss. - Severe burns.
- II- Blood products:
 - 1- Packed RBCs. In chronic anemia.
 - 2- Platelet-rich plasma. In thrombocytopenia.
 - 3- Platelet-concentrate.
 - 4- Fresh frozen plasma. Abnormal coagulation



4-Catheters :

A- Foley's catheter (self retaining) .

Consists of:

1- Balloon at its inner end to prevent slipping of the catheter from its position by inflation .

2- Double ways (lumen), one for balloon inflation and the other for drainage or with triple ways the third for wash if needed .

* We inflate the balloon by saline not by air or any irritant fluid .

* The amount of saline needed for inflation different according to the size of the catheter which is present on the balloon inflation lumen.

3-The inner end of the catheter have two opening at the same level.

- The size of the catheter and the balloon capacity are recorded on the drainage way .

B- Nelaton (Non self retaining) .

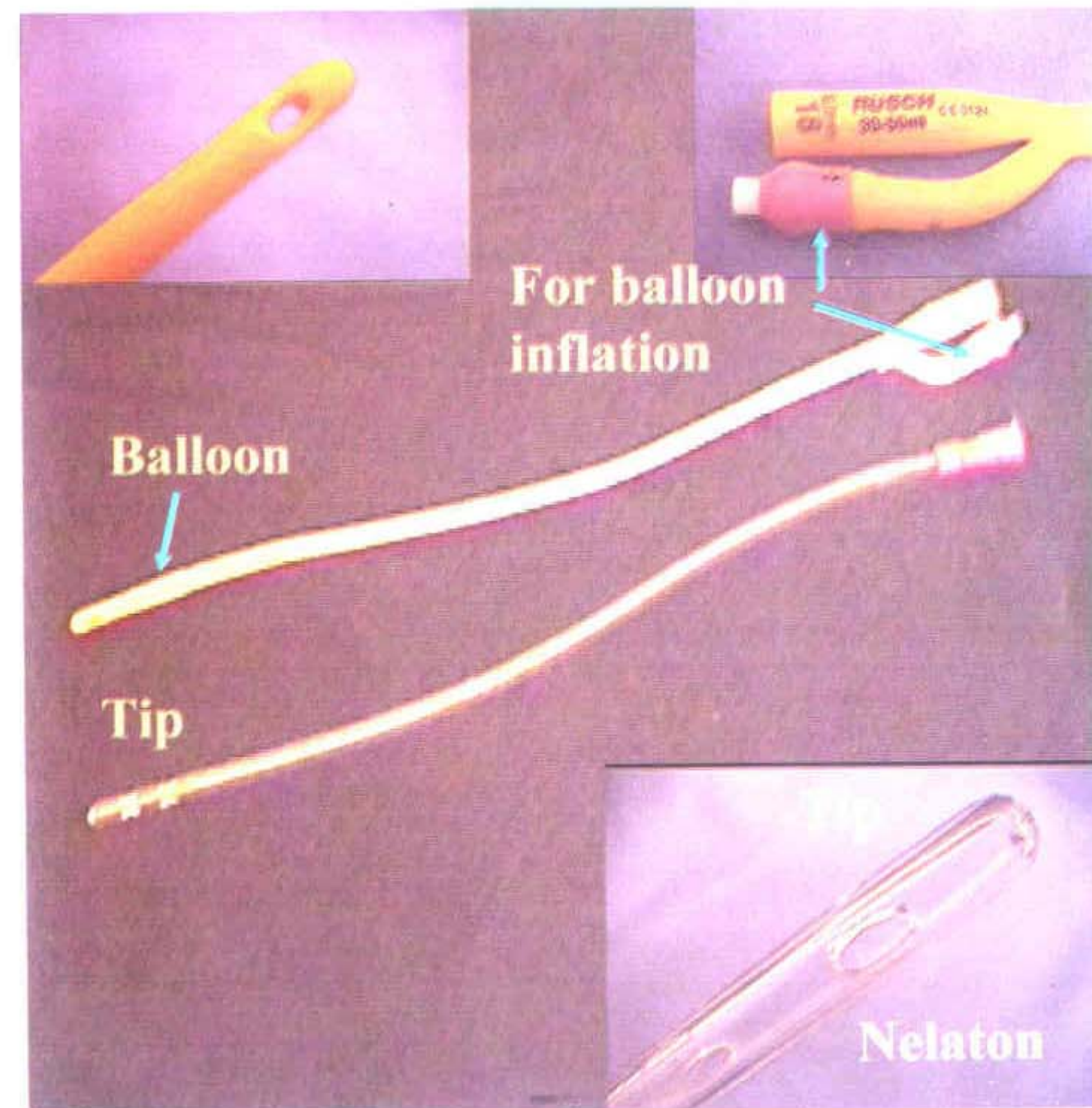
- Removed after evacuation of the bladder .

- Have a single lumen .

- Have multiple opening at different levels on its inner end.

- The outer end has wide cone shaped part of different colors fore easy identification of catheter size (Each color refer to one size).

- Sometimes used as drain .

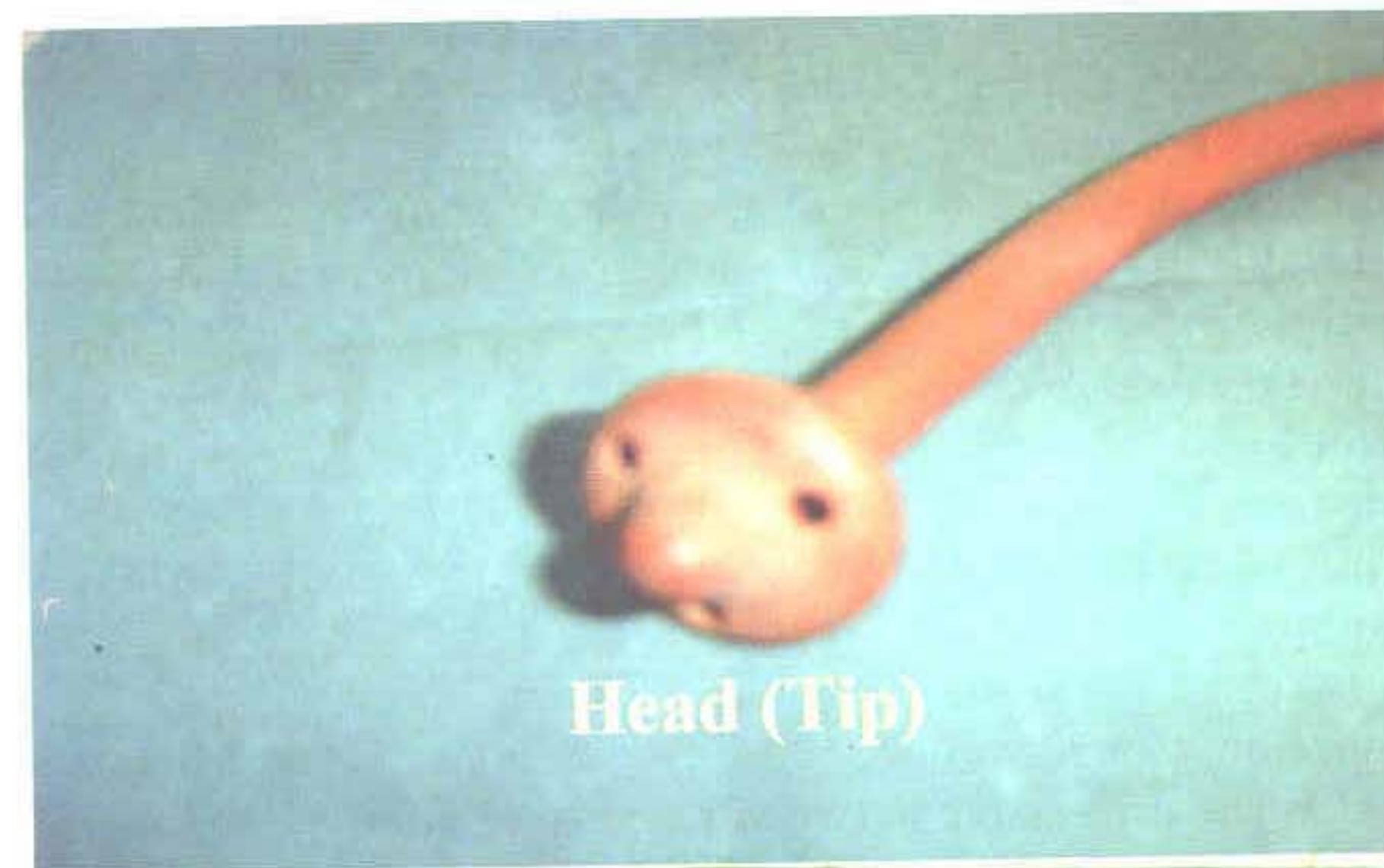


C- Depezer catheter :

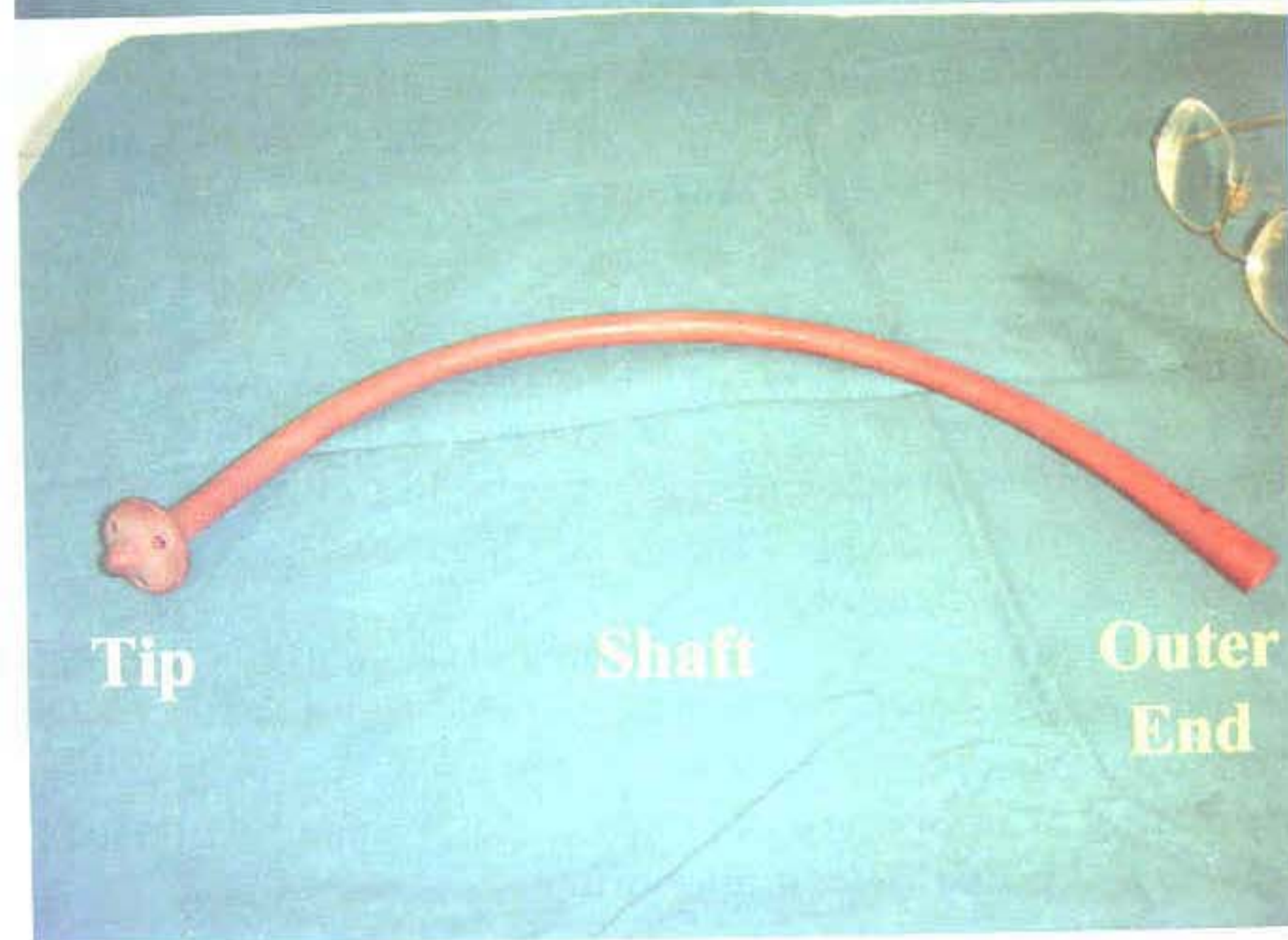
- Self retaining catheter .
- With large compressible head have a multiple pores on its surface this head which keep the catheter in its position .

Are there other uses for the foley,s and Depezer, scatheters ?

- Yes, sometimes we use these catheters in gastrostomy (Stamm , transient) and in cholecystostomy .



Head (Tip)



Tip

Shaft

Outer
End

5- Rayel tube :

For gastric aspiration. Consists of :

- 1- Inner blunt (none traumatized) and closed end have multiple openings (for drainage) at different levels.
- 2- Outer cone shaped colored (each color refer to one size) end for connection with the drainage bag.
- 3- Transparent tube.

What are the indications of gastric aspiration with rayel tube?

- 1- After all types of intra-abdominal operations to avoid postoperative paralytic ileus (removed after return of the intestinal peristalsis).
- 2- After any gastric or intestinal anastomosis to protect line of anastomosis from disruption (removed after 3-5 days) .
- 3- In intestinal obstruction to avoid vomiting and abdominal distention.
- 4- To take sample from gastric secretion.
- 5- Sometimes for naso-gastric feeding in comatosed patients.

- What is the difference between rayel tube and nelaton catheter?

- They are similar in every thing except in length.

Of course the rayel is the longer to by pass the mouth and esophagus to reach to the stomach.

6- T-tube :

-What are the Indications of T-tube drainage?

- 1- External drainage to the C.B.D. after its exploration.
- 2- Repair to common bile duct over t-tube in C.B.D injury.

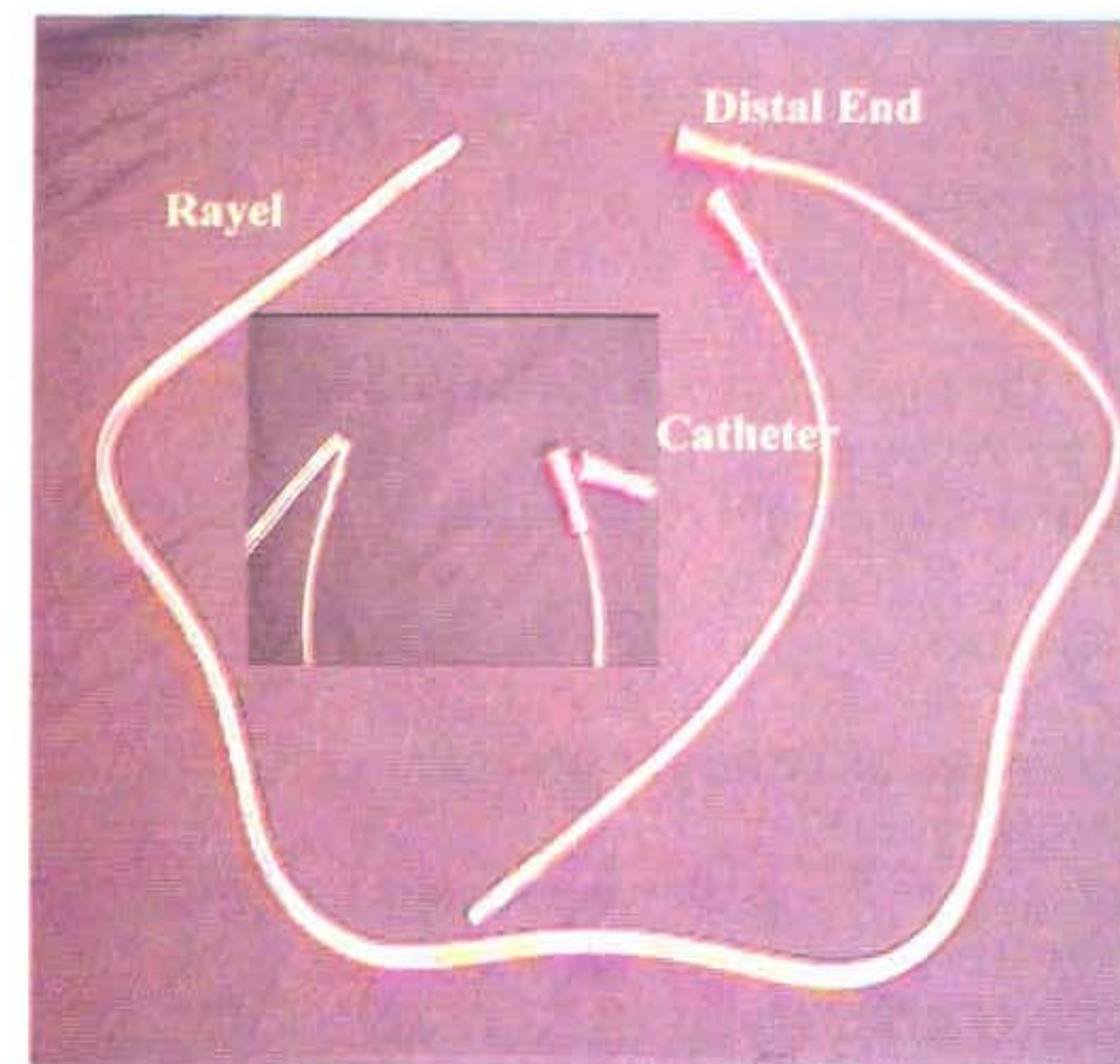
-What are the indications of C.B.D. exploration?

A- Preoperative indications:

- 1- History of jaundice.
- 2- History of ascending cholangitis.
- 3- Roentgenographic visualization of a stone.

B- Intra-operative indications:

- 1- Aspiration of mud from the CBD.
- 2- Markedly dilated CBD.
- 3- Presence of palpable common bile duct stone.
- 4- Presence of multiple stones in the gallbladder together with large cystic duct.



5- Rayel tube



6- T-tube

- What are the methods of C.B.D. exploration?

A-Preoperative:

1-E.R.C.P. 2-M.R.C.P.

3-Ultrasonography and C.T.

4-Percutaneous trans-hepatic cholangiography.

B-Operative:

1-Palpation of the duct after Kocherization of the duodenum.

2-Aspiration by syringe.

3-Choledochotomy and sound exploration. 4-Choledoscopy.

C-Postoperative:

1-By T-tube cholangiography.

2- ERCP.

- What are the types of biliary drainage?

A-External drainage:

1-T-tube drainage. 2- Per-cutaneous trans-hepatic drainage.

3- Naso-biliary drainage. 4- Cholecystostomy.

B-Internal biliary drainage:

1-Sphincterotomy & sphincteroplasty.

2-Choledochoduodenostomy.

3-Choledochojejunostomy.

4-Hepaticojejunostomy.

- When we can remove the t-tube?

-From 10 to 12 days after the operation to be sure that the edema is subsided and healing of anastomosis occurred.

- What we do before its removal (Precautions)?

1- Clipping the CBD for 48 hours and we notice jaundice and colic.

2- T-tube cholangiography to be sure that the C.B.D. is patent and there is free drainage of the day to the duodenum without filling defect in C.B.D.

What we do if there is missed stone?

1-T-tube wash (may be clot).

2- Removed by ERCP.

3- Removed by choledochoscopy through mature t-tube tract.